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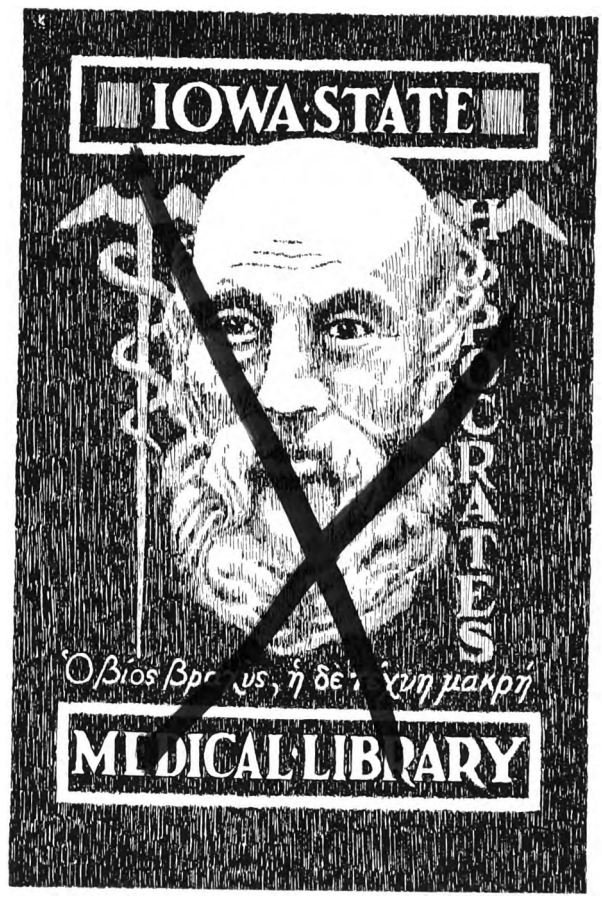

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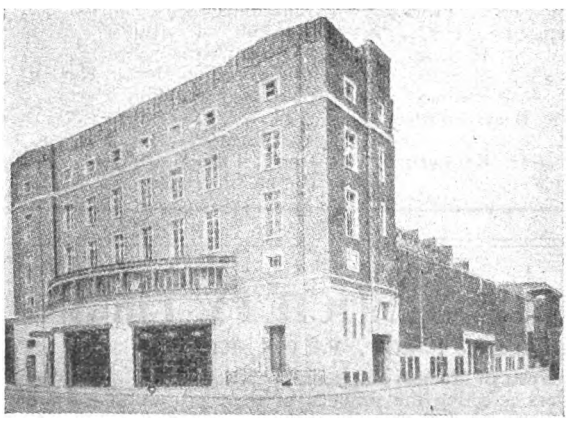

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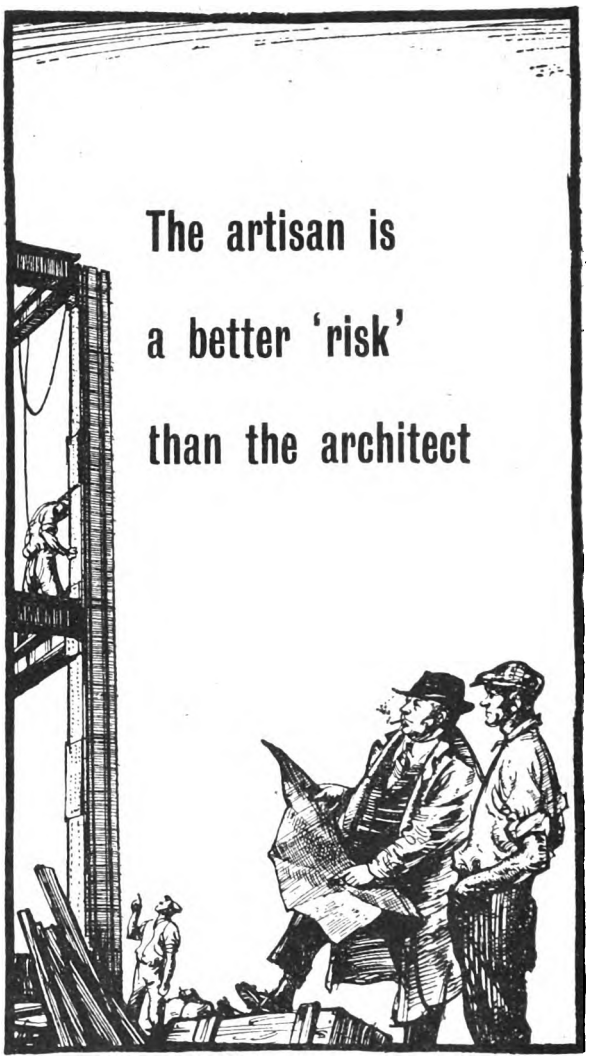

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MAURICE CAMPBELL
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PHYSICIAN TO GUY'S HOSPITAL

THE paroxysmal tachycardias include four varieties of paroxysmal arrhythmia: supraventricular (auricular and nodal) tachycardia (60%), auricular fibrillation (30%), auricular flutter (6%), and ventricular tachycardia (4%). Clinically, when no electrocardiogram is available, the diagnosis of paroxysmal tachycardia must continue to be made and will include some cases of paroxysmal flutter with regular 2 : 1 block and some of ventricular tachycardia. This will not detract from its value so much as it may seem to, for they will be few and, in the main, types that behave clinically like auricular tachycardia.

Fortunately the frequency and seriousness of these arrhythmias are in reverse order, ventricular tachycardia being the least common and much the most serious. I shall make no distinction between auricular and nodal tachycardia, and little if any difference has been found, which is helpful, since they can only be distinguished cardiographically. The two are combined as supraventricular tachycardia. I may sometimes, as others have done, use auricular tachycardia as synonymous with this; in fact it may be more accurate to do so, both rhythms arising in the auricular muscle, one nearer to the S-A and the other nearer to the A-V node.

In most cases the meaning of "paroxysmal" can be in no doubt; but, especially since the introduction of quinidine, it may not be easy to know if a rhythm was paroxysmal or had become established. I suggest that no rhythm persisting more than fourteen days should be called paroxysmal without some qualification, such as protracted; and that, where an abnormal rhythm occurs once or twice only during some other illness or cardiac infarction, it should be called transient rather than paroxysmal. I have emphasised this with paroxysmal fibrillation, but it is of more general application.

It would be tedious to describe in detail how I reached these percentage figures for the different arrhythmias. The 5000 patients attending the cardiographic department, Guy's Hospital, during 1927–36, and two years' outpatients at the National Heart Hospital, have been analysed. I have also modified them by the types seen in my private practice and such published statistics as seem pertinent, especially many papers of White, who states that, in his experience also, paroxysmal tachycardia is twice as common as paroxysmal fibrillation.

Following classical precedent I have divided the clinical picture into diagnosis, ætiology, symptoms, prognosis, and treatment. In some ways it would have been simpler to discuss all the arrhythmias together, but this would have given a less complete picture of any one of them. I have compromised by combining all diagnosis and treatment in two sections, before and after discussing the other aspects of each separately. All these arrhythmias, even flutter and ventricular tachycardia, may be physiological and of no significance in indicating heart disease.

Diagnosis

Often the attack is not seen and there is only the history; reliance must then be placed on the abrupt onset, and the rapid beating of the heart is nearly always the first symptom felt, whatever others may follow. The patient complaining of palpitation should be asked, "How does it start? When was the last attack? How long did it last?" A decisive answer to these three questions will generally establish the diagnosis with certainty, for ordinary palpitation is much too vague and indefinite to allow the patient to define the number and length of attacks with precision. The end of the attack is as sudden as the onset, but the patient may be less capable of detecting it, as simple tachycardia may follow the paroxysm. Most other symptoms are too variable to be reliable, and extrasystoles before or after the attack may obscure the clear picture.

Inquiry must then be made about whether the heart was regular or irregular, and, perhaps surprisingly, the patient's statement usually proves to be reliable, and I have seen few instances where a subsequent record showed it to be wrong.

If the rhythm is irregular, fibrillation and flutter with varying A-V block can only be distinguished by graphic methods, unless the irregular rhythm is interrupted by regular periods, or the signs of regular auricular activity can be seen on radioscopy or in the jugular pulse. If some paroxysms are regular and some irregular, the regular are more likely to be flutter.

If the rhythm is regular, it is impossible, without graphic methods, to distinguish between auricular and ventricular tachycardia and flutter with 2 : 1 A-V block. If the patient is already under treatment, especially with digitalis, after congestive failure or cardiac infarction, ventricular tachycardia is likely, though not certain; otherwise it is unlikely because of its rarity. The help given by the rate is discussed below.

Apart from the rate, the following points may help to distinguish between paroxysmal flutter and tachycardia. If the regular rhythm is interrupted by a slower or irregular rhythm, if the rate can be halved by pressure on the carotid sinus, or if, in the longer attacks, the rate can be halved or made irregular with digitalis, the attack is flutter. Auricular tachycardia rarely lasts more than ten and generally not more than four days; therefore the longer an attack of unknown origin lasts, the more likely it is to be flutter. If the patient has heart disease, or if congestive failure develops rapidly, flutter must be thought of but cannot be diagnosed merely on these grounds. Occasionally, even when a cardiogram is obtained, there may still be difficulties—e.g., slow flutter without heart-block; and a faster rate with 2 : 1 heart-block where the P and T waves cannot be clearly distinguished. Every effort should be made to obtain a cardiogram of an attack, to make certain of the diagnosis of flutter or ventricular tachycardia—the latter being of special importance for prognosis.

Paroxysmal Supraventricular Tachycardia

My conclusions are based largely on a series of 165 cases with 66 cardiograms followed up some years. Though so many papers have been written on the subject, most deal with points of interest in single cases, and few with large consecutive series. Hume (1930) gave a valuable summary, and Cooke and White (1942) have written a useful paper on prognosis. The condition is relatively common, though those doctors who rarely diagnose it unless they see a patient in an attack will continue to think it rare, because short attacks are so much more common.

ÆTIOLOGY

The first question to decide in each patient is whether there is any organic heart disease, as this knowledge is essential for prognosis. The ætiology of my 165 cases is shown in table I, and more than half had no heart disease. There is such close agreement on this subject between these series of cases that it may be generally accepted, the percentages without heart disease being 62 (Campbell and Elliott 1939), 62·5 (Hume 1930), and 62 (Gallavardin and Froment 1930), such exact correspondence being due to chance. White also has found the majority

* The Lumleian lecture delivered at the Royal College of Physicians on April 16 and 18, 1946.

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without heart disease; and, if this is true of those seen by cardiologists, it must be even more true of others. If a patient has paroxysmal tachycardia, it is statistically more likely that his heart is otherwise healthy than that it is diseased.

SEX AND AGE INCIDENCE

There is no difference in sex incidence, the extra women in the rheumatic group being balanced by more men in the myocardial group. In four combined series there were 250 men and 252 women.

The age at which the attacks started is shown in table I. Briefly, 67% started before the age of 40 and only 33% after that age. With paroxysmal fibrillation the figures are almost exactly reversed, 25% before 40 and 75% after that age.

Even when there is heart disease, the onset of this is rarely the immediate cause of the paroxysms. Sudden or unexpected movements are the most common known cause, but in an even larger number of attacks there is no obvious reason for their start. The influence of various factors—infection, anxiety, indigestion, smoking, exercise, and pregnancy—in making the patient more liable to have attacks was discussed by Campbell and Elliott (1939).

SYMPTOMS OF PAROXYSMS

Apart from palpitation there may be various symptoms, any of which may be more or less prominent and exceptionally may mask the nature of the paroxysm, especially in children. Rarely, the patient may be unaware that he is experiencing an attack. The general symptoms—palpitation, breathlessness, inability to stand, faintness, dizziness, and anxiety—are of little special significance. Any degree of incapacity up to complete prostration may be met with, and may be attributed to any of these sensations; this depends mainly on the state of the heart muscle, on the length and, to a less extent, the rate of the attack, and on the mentality of the patient.

If the heart is healthy, the symptoms are generally discomfort rather than real disability. Many patients could carry on their routine work, though they found it more of an effort. At the other extreme some developed congestive failure. Many of those with rheumatic or other heart disease had little more disability than had most of the normals, yet with severe heart disease any attack may be very grave. If an attack lasts one or two days the symptoms and disability generally become important, even if the heart is healthy; but a healthy heart will support short attacks, even at such a rapid rate as 200, surprisingly well.

Loss of Consciousness.—Unconsciousness during an attack is uncommon, and equally so with paroxysmal fibrillation. It is more common with paroxysmal flutter and is generally due to the assumption of 1 : 1 rhythm, often as the result of exercise.

Anginal Pain.—Besides discomfort or tightness in the chest, present in most attacks and of no special significance, an eighth of the patients, including many with normal hearts, had more severe anginal pain during attacks, some occasionally, and others when the attack had lasted some hours. In few was the pain really severe. Anginal pain is rather less common in paroxysmal fibrillation but more common in paroxysmal flutter (a quarter of the cases). Pain, even of a severe anginal type, does not indicate an unfavourable prognosis; this must be judged mainly by the condition of the heart during the free periods.

Congestive Failure.—The occurrence of congestive failure in a paroxysm does not prove that the patient has heart disease, though if it develops soon after the start of the paroxysm it is significant. Failure, generally right-sided, was seen during one or more attacks in an eighth of the patients.

One man without heart disease, after several attacks without failure, had developed it by the eighth day of a ten-day attack, when the blood-pressure had fallen from 140 to 105 mm. Hg.

Another normal adult had failure in her two long attacks of seventeen and twenty-nine days.

Two children with normal hearts developed failure in attacks lasting two or three days, but the rates were exceptionally fast.

Most others had heart disease. One of the hyperpietic patients is alive and in fair health fourteen years after the paroxysm, in which severe failure was seen on the seventh day of a twelve-day attack. In most the failure became apparent about the third day. Not many attacks lasting three days were observed in normals, as they were less likely to seek medical advice, but the figures quoted indicate that the development of congestive failure depends, as a rule, on heart disease. Its occurrence does not seem so serious as might be expected, especially where the heart is normal or well compensated in the free intervals.

In paroxysmal fibrillation, and still more in flutter, failure develops more readily, unless the rate is quickly controlled with digitalis.

Nausea, vomiting, flatulence, and abdominal pain are important symptoms in about a tenth of the cases. In longer attacks the congestion of the liver and stomach as the result of failure may be misinterpreted and thought to be the cause of the attack.

Embolism.—This is a rare complication, though both cerebral and pulmonary embolism have been seen. It is more common where there is mitral stenosis.

HEART-RATE IN PAROXYSMS

Lewis (1920) places the usual rate between 160 and 200 per min., with a range 110–220. This upper limit is not high enough; it is not very rare for it to reach 240. In my cases the rate was 160–200 in about half, and 140–240 in 90%. In 5 cases rates were less than 140—136, 132, 126, 124, and 112—and in 4 as fast as 230, 234, 240, and 248.

Table II shows how the rates were distributed among all the different types of paroxysms. There were cardiograms of 99 attacks from 81 patients (two from the same patient being counted when the rate was different), and of 42 others observed clinically. There is no reason to think that the "clinical" rates are not accurate, except that there were fewer under 160, perhaps because paroxysms at a slow rate are less likely to be diagnosed without a graphic record. The rate should always be taken for half a minute. Generally, when the rate is said to be uncountable, it is because an attempt has been made to count the pulse by the finger instead of the heart by the ear.

The range of rates does not in the main vary with the type of paroxysm or on the presence or absence of heart

TABLE I—ÆTIOLOGY AND AGE INCIDENCE

Ætiology	Percentage at each age (years)					Percentage at all ages
	Up to 19	20 to 39	40 to 49	50 to 59	60 and over	
	Paroxysmal supraventricular tachycardia					
Normal† ..	15	31	8	5	3	62
Rheumatic ..	2	12	3	0	1	18
Myocardial*	0	5	6	6	3	20
	Paroxysmal auricular fibrillation					
Normal }	0	9	8	7	5	{15
Thyrotoxic }						{14
Rheumatic ..	2	11	6	2	1	22
Myocardial* .	0	2	8	16	23	49
	Paroxysmal auricular flutter					
All cases ..	0	12	12	46	30	100
	Paroxysmal ventricular tachycardia					
All cases ..	4	10	22	34	30	100

* Includes hyperpietic. † Includes thyrotoxic.

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disease. Nodal attacks were a little slower, more falling between 140 and 180, perhaps because it is then easier to distinguish P and to decide that the attacks are nodal. Even the supraventricular (average 187) and ventricular (average 198) had the same general range, most being between 150 and 220, though a larger proportion of the ventricular were above 190. Nor did the presence or absence of disease seem to be important, and the average in the separate groups was 180–190. The range was much the same, and all groups have slow and fast attacks.

The rate in different attacks is said to keep constant. This is our general experience, and cardiograms of different attacks from several cases were almost identical after an interval of years. In many patients, however, they varied by as much as 10–15%. In short attacks the rate may vary within a few minutes, but sometimes this means two different ectopic foci. Where rates were observed in several paroxysms, a third showed a difference of 12–30 beats a minute; most of these had heart disease. The period over which paroxysms have occurred did not in itself cause a change in rate. There was some evidence that, as the efficiency of a diseased heart lessens, the rate of the paroxysms may fall; but others observed up to the time of death maintained a constant rate to the end. An increase in rate as the myocardium failed was less common.

Flutter differs from the other arrhythmias in that the rate may be regular or, rather less often, irregular.

TABLE II—HEART-RATE IN PAROXYSMAL TACHYCARDIA

Type of paroxysm	Percentage of cases with rates of—							No. of cases
	Up to 139	140 to 159	160 to 179	180 to 199	200 to 219	220 to 239	240 and over	
Clinical paroxysmal tachycardia	0	14	28	24	22	7	5	42
Supraventricular tachycardia	6	26	26	16	14	7	4	80
Ventricular tachycardia	5	16	16	21	26	10	5	19
Paroxysmal flutter ..	29	24	35	12	0	0	0	17

In my patients the auricular rate varied between 180 and 380 a minute—most commonly between 240 and 340. The usual finding was 2 : 1 block; hence the ventricular rate was generally between 120 and 170.

In table II the ventricular rates in paroxysmal tachycardia and flutter are contrasted and the differences are striking, though there is much overlapping. In flutter nine-tenths are below 180. In paroxysmal tachycardia nine-tenths are between 140 and 220. Expressed in another way, if the ventricular rate is below 140, flutter is more likely (2 to 1); if between 140 and 180, paroxysmal tachycardia is more likely, but paroxysmal flutter is not uncommon ($3^1/_2$ to 1); but, if the ventricular rate is over 180, paroxysmal tachycardia is almost certain (13 to 1). The rate of 160 is the nearest possible approach to a dividing line, but it is very inexact. In 52% of the cases of flutter the rate is below 160; in 72% of the cases of paroxysmal tachycardia the rate is above 160, and in nearly half 160–200.

LENGTH OF ATTACKS

Paroxysms last hours much more commonly than days. Though variable, they tend to have a more or less customary length in any one person, who can generally report that the attacks last between, say, two and eight hours, or less than half an hour, or more than a day, and is surprised if his past experience does not prove a useful guide to what to expect. The usual lengths of paroxysms was up to half an hour in a third; under two hours in more than half; and under six hours in three-quarters: only a tenth habitually had attacks lasting a day or more, though longer attacks are more likely to come under observation.

TABLE III—DURATION OF PAROXYSMS OF TACHYCARDIA AND OF FIBRILLATION (PERCENTAGES)

Duration of paroxysms	Paroxysmal tachycardia		Paroxysmal fibrillation
	Usual length *	Longest duration †	Usual length ‡
Up to 2 hours ..	60	65	9
2–6 hours	17		20
6–12 hours ..	10		13
12–48 hours ..	13	21	25
2–10 days	—	9	22
Over 10 days ..	—	5	11
No. of cases ..	100 *	325 †	..

* Campbell and Elliott (1939).
† Combined figures for Campbell and Elliott (1939), Hume (1930), and Gallavardin and Froment (1930).
‡ Orgain et al. (1936).

The longer paroxysms are more important, for the disability and the chance of congestive failure are increased. Of 100 patients 29 sometimes had an attack that lasted more than a day, but in 10 it was not much longer than this. Of the remaining 19 with long attacks there were 6 (including 2 children) with healthy hearts. The long attacks were least common in those without heart disease—11% of the normal, 21% of the rheumatic, and 33% of the other groups having these long attacks. All the types of attacks were represented, but there was a higher proportion of ventricular paroxysms than of the other types, nearly half the former lasting more than a day.

Even among these longer attacks relatively few lasted more than two or three days, and they were of this length in 8 of 100 patients. In 2 others they lasted four days; in 2 up to seven days; and in 5 ten days; only in 2 did they last longer than ten days. In one of these patients attacks lasted seventeen and twenty-eight days; in the other, who had had attacks for twenty years and during five years' observation had about ten a year lasting never more than forty-eight hours, three attacks lasted seventeen, twenty-nine, and about thirty-five days.

These long attacks are very unusual and more serious but they may occur without there being any disease of the heart. Most paroxysms last hours rather than days, but 30% of our patients had one or more attacks lasting a day; 10% of these very rarely, 10% occasionally, and 10% habitually. The general agreement about the short attacks is shown in table III. If the figures are combined only 20% had an attack lasting more than a day, and only 5% more than ten days.

Attacks lasting more than a month are extremely rare, but some unusual cases have been recorded where they have lasted, possibly with interruptions, up to a year. Nothing, however, corresponding to established tachycardia has been described, though the case of Miller and Perelman (1945) is of interest in this connexion.

PROGNOSIS

The immediate outlook is excellent; and, however long a paroxysm has lasted, whatever the rate, and however ill the patient may seem, he may be expected to recover. It is often stated that a patient may die in a paroxysm; this is rare, and it creates just the impression which it is necessary to avoid in the large majority, where there is no danger. Only 6 of my 166 patients have died suddenly or unexpectedly, and they will be described to justify my general optimism.

The first patient had been subject to paroxysms twenty-six years before he died, probably from a double injection of morphine from two doctors independently.

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The second patient had mitral stenosis, and, after ten years of paroxysms, was admitted with pregnancy, severe anæmia, and early failure on the fourth day of an attack; she died on the seventeenth day after losing much blood with a miscarriage.

The third and fourth patients had anæmia, and one of them pelvic suppuration also; frequent paroxysms contributed to the fatal issue by pulmonary embolism from venous thrombosis. In these cases the paroxysms were not the cause of death, but they illustrate the danger of embolism and thrombosis, especially in the presence of anæmia.

The fifth patient had pericarditis and died on the eighth day of an attack.

The sixth patient has been fully reported (Campbell and Elliott 1939); after twenty-one years with attacks he died of congestive failure in a five-week attack.

Cooke and White (1942) report 7 deaths among more than 700 patients: 2 from cerebral embolism, 1 from pulmonary œdema (with mitral stenosis), 3 after operations with a great fall of blood-pressure, and 1 child with pneumonia.

These 13 cases give a good general picture of the risks: of thrombosis and embolism, especially in the presence of anæmia; of long attacks after major operations or with concurrent illnesses; of attacks precipitating failure in a heart that has little margin; and of an exceptionally long attack that cannot be stopped. If it is known that the paroxysms are not ventricular, these are, I think, the only risks.

Perhaps it is surprising that these risks are not greater. The rapid rate is a great strain on the circulation and cannot be reduced as it can in fibrillation with digoxin. The fall of blood-pressure will give some idea of the risk in a long attack and indicate when the most heroic measures should be taken to arrest it. Barcroft et al. (1921–22) found that in a healthy man paroxysms at a rate of 200 reduced the output of the heart from 78 to 13 ml. per beat, and the minute volume to less than half (from 5·5 to 2·6 litres). It is therefore not surprising that the circulation should be so much affected, and that thrombosis may develop, especially if other factors, such as anæmia and infection, predispose to it. Many extremely low pulse pressures have been found in attacks, especially with congestive failure.

If the patient is seen for the first time during a paroxysm, it is most important to decide whether there is heart disease or not. During a paroxysm murmurs may be missed and the size of the heart may be difficult to estimate, and for some days after a paroxysm the cardiogram may be deceptive. Campbell (1942) described 5 cases with striking but transient changes in the T waves suggesting cardiac infarction after the paroxysm; 3 of the patients are still alive and are thought to have normal hearts, one of them having been watched with paroxysms for twenty years. Reversible chemical changes in the myocardium as the result of a long attack are probably responsible. Others have confirmed this finding.

Having recovered, the patient will want to know the chance of another attack. Single paroxysms are rarer than with fibrillation, but one student had an attack (recorded), and twenty years have passed without a recurrence. This is, however, unusual, and paroxysms will probably recur; but, if they are frequent enough to be troublesome, steps can generally be taken to reduce their frequency.

The immediate outlook is therefore excellent in nearly all cases. Even when a paroxysm occurs after cardiac infarction, as it does in 3% (Master et al. 1937), it does not add greatly to the seriousness of the prognosis.

Ultimate Prognosis.—This depends mainly on the condition of the heart in the free intervals. The early papers were pessimistic about the outlook, but more recently there is wider agreement that the prognosis is good. Of my 92 patients seen in 1925–32 and followed up to 1938, more than half had, when they were last seen, had their attacks for more than ten years; hence there was ample opportunity to observe any unfavourable changes.

Attacks may continue throughout the greater part of life without the development of heart disease. Of Hume's (1930) cases 32 had an average duration of fifteen years and 1 had a normal heart after fifty-two years. Cooke and White (1942) traced 57 of 80 with normal hearts and found them in good health after an average time of twenty-five years after the onset of their paroxysms—1 after sixty-four years. Of my own cases (Campbell and Elliott 1939) 21 were in good health after an average period, with attacks, of twenty years—1 after sixty years.

A decrease in the frequency of the attacks from some change in the patient's life is as likely as an increase. Paroxysms do not cause progressive deterioration, still less disease of the heart, though some are resistant to treatment and continue with the same frequency over many years.

In one patient paroxysms started when he was 9 years old and continued through life; but until a few months before his death at 69, from leukæmia, he led an active life, having recovered from pneumonia the year before.

Another started having paroxysms at 50; at 74, though they were rather frequent, he was still in business and had no dyspnœa.

A third was 68 when he was first seen, and paroxysms had started at 23 and recurred about every two weeks; at 75 he had no complaint except of "a dulcimer constantly playing all the old tunes that had run through his life," a symptom of increasing nerve deafness.

All these 3 patients had normal cardiograms, in spite of their age, and no signs of heart disease. Even among the rheumatic patients most have done as well as could have been expected had they been free from paroxysms.

Campbell and Elliott (1939) concluded that the prognosis was excellent unless, appearing late in life, it was the first indication of coronary disease. Cooke and White (1942), commenting on this, thought the prognosis good even when the paroxysms started late in life; 57 of 128 patients with normal hearts started their paroxysms after the age of 40. Excluding the 16 with paroxysms after cardiac infarction, they found only 2 unexpected deaths, and concluded that, arising in later life, paroxysms may warrant a more serious prognosis in comparatively uncommon cases, but generally have no influence on the ultimate outcome. With this I agree, as I have seen no more instances where paroxysms were the immediate precursor of angina pectoris, and many paroxysms in elderly patients where the subsequent course has been satisfactory.

Paroxysmal Auricular Fibrillation

Auricular fibrillation often occurs in paroxysms, though the established form is more familiar. My conclusions are largely based on 200 consecutive cases seen by Parkinson and Campbell (1930); many cases seen since have scarcely modified our conclusions, and so the figures quoted without any statement of their source are taken from this series.

I am glad to have the opportunity of thanking Dr. John Parkinson for his help, and Dr. Paul White, of Boston, as I shall refer to his work so frequently.

ETIOLOGY

Is the occurrence of paroxysmal fibrillation evidence of disease? Gossage and Hicks (1912) thought it might be caused by toxic or reflex influences on a healthy heart. Cowan (1928) has elaborated this with some striking cases and suggested that, when established, it is generally caused by organic disease but, when paroxysmal, more often by toxic or reflex factors. This distinction, though of value, cannot be accepted without reserve, because paroxysmal fibrillation often becomes established and

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often occurs with structural disease, but some chemical or reflex stimulus most probably provokes the paroxysm, whether the heart itself is healthy or diseased. White thought that a fifth of his patients seen in consultation had no organic heart disease.

The ætiological grouping of our patients is shown in table I. Syphilitic heart disease was found in 2·5% only (and has been included in the tables with myocardial disease); it is therefore of as little importance in paroxysmal auricular fibrillation as in auricular tachycardia. There were two main contrasts with auricular tachycardia: the percentage with normal hearts was 15 instead of 62; and with goitre 15 instead of 6 or less, and most of these had thyrotoxicosis, which had not always been the case with those with auricular tachycardia.

Toxic and Infective Causes.—Paroxysms have occurred after pneumonia, rheumatic fever, infective endocarditis, septicæmia, tonsillitis, erysipelas, influenza, diphtheria, dysentery, and osteomyelitis; and with simple and malignant pleural effusions, biliary colic, appendicitis, gastro-enteritis, and, more often, cystitis and pyelitis with an enlarged prostate. But on the whole the shortness of this list shows that an acute infection is only an occasional factor.

The action of digitalis in starting fibrillation is well proved, and was emphasised early by Mackenzie (1908). It is more likely to provoke fibrillation where there is already failure with normal rhythm. It is only under these conditions that it follows small or moderate doses. No other drug produces fibrillation so often, though it has been described after adrenaline, arsenic, aspirin, carbon monoxide, and iodine in the treatment of goitre.

The influence of tobacco and alcohol (and even coffee) is difficult to estimate. They are often used excessively by patients with paroxysmal fibrillation and have been blamed as the cause, but there are few reports of complete relief for any long period with abstinence from either to prove them more than accessory factors, and we have few patients in whom the attacks could be entirely or even partially attributed to these causes.

Paroxysms are not uncommon after thyroidectomy, and may occur after other operations. Attacks have been induced by electric shocks, vagal pressure, deep breathing, coughing, and straining at stool; but these are unusual, and such events and sudden movements do not have the same importance as in auricular tachycardia.

A large meal or exercise just after a meal may provoke an attack. It is difficult to establish the relation between indigestion and paroxysms. Paroxysms are not a recognised feature of the organic dyspepsias. Dietary indiscretions and overeating have often been blamed, and many patients are inclined to attribute their attacks to such causes on scanty evidence, but the abdominal discomfort caused by the attack may be mistaken for the cause.

DURATION OF PAROXYSMS

In 160 of our 200 patients no attack was known to have lasted more than two days. Up to eight hours, from six to eighteen hours, or from about twenty-four to about forty-eight hours were characteristic answers. Unfortunately this series was not recorded in the same way as paroxysmal tachycardia, in which attacks lasting two days or more occurred in 5% only, against 20% in paroxysmal fibrillation. Orgain et al. (1936) gave the usual duration in their cases, and I have analysed their figures for comparison (table III). Nearly three-quarters of my cases of paroxysmal tachycardia had a usual duration of less than six hours; nearly three-quarters of those with paroxysmal fibrillation had a usual duration of longer than this.

Attacks lasting more than two days only occurred in a fifth of our patients. In 16 of the 29 where attacks lasted four days or longer the absence of more than one or two attacks showed that they were not of the usual recurrent type. In several of these fibrillation became established after only one or two paroxysms; in some it was an incident in the course of heart-failure; but in some there was no other evidence of heart disease. There were only 8 of our 200 where one of the typical recurrent paroxysms lasted more than four days. The longer attacks that were known exactly were nine, eleven, twelve, nineteen, twenty-one, and thirty days, and 6 others of about two or three weeks.

Finally, 5 other cases were really in a class by themselves, as fibrillation had been present for months or over a year when normal rhythm returned, in 3 cases during treatment with digitalis with great advantage. Lea (1918–20) recorded a short interval of normal rhythm after years of fibrillation. Cases of fibrillation stopped after thyroidectomy have been excluded.

CLASSIFICATION OF PAROXYSMS

The different types of paroxysms have often been noted. Heitz (1914) divided them into frequent short and infrequent long attacks (often with more severe symptoms). Fahrenkamp (1917) and Gerhardt (1915) distinguished the same groups, the former resembling paroxysmal tachycardia, and the latter having temporary fibrillation for days or weeks. Krumbhaar (1916) introduced the term "transient" for these, and added the type, noted by Vaquez (1911) and Mackenzie (1908), where fibrillation occurred for a short time in paroxysms before it became established. The word "transient" is not perfect as a description, since it might be applied to any paroxysm, but it serves to designate a group differing from the usual type. Most writers have found that the isolated attacks tend to last longer than those which recur often, and this was true in our series.

The following classification seems useful not only for paroxysmal fibrillation but also for paroxysmal flutter and, to a lesser extent, paroxysmal tachycardia:

Group I: Typical paroxysms occurring (1) often, or (2) at long intervals, comparable in many ways with paroxysmal auricular tachycardia (58%).

Group II: A short series of paroxysms occurring before fibrillation is established (12%). In many of group I also fibrillation will become established ultimately.

Group III: "Transient" fibrillation, very few paroxysms (generally only one), often of longer duration:

(1) in the course of heart-failure, often without affecting it (8%);
(2) after cardiac infarction (6%);
(3) associated with infections, &c.—e.g., pneumonia—(6%);
(4) with no apparent cause (10%).

Coronary Thrombosis in Relation to these Paroxysms.—Paroxysmal fibrillation is not often a striking feature after coronary thrombosis; but, if the cases are under observation in hospital, it can be noted more often. White and Bland (1931) found it in 13 of 200 cases, and Master et al. (1937) and the present series give about the same proportion. Two other patients, after having ordinary paroxysms of fibrillation for five and nine years, developed coronary thrombosis.

Paroxysms of fibrillation occur in 7% of cases of cardiac infarction and in 3% of cases of angina. A small proportion of patients with paroxysmal fibrillation have angina, and a few get anginal pain that is not of serious significance during these attacks.

PROGNOSIS

There may be a normal heart or congestive failure but most often some degree of heart disease of slow evolution. Quinidine often proves of great value. There is no doubt of the success of surgical treatment in all cases where there is goitre; thiouracil can be effective, but its rôle is still unsettled. In other cases the prevention of attacks is difficult, but they are not dangerous.

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and the long history of many patients shows that paroxysmal fibrillation does not usually indicate the graver forms of heart disease.

During the Attack.—The outlook in an attack is excellent. It is rare for a patient to be extremely ill because of the paroxysm, and the danger to life is negligible, unless there is already a seriously damaged heart.

Will the paroxysm end spontaneously? It usually lasts less than four days; but after this period permanent fibrillation becomes more likely, and after seven and fourteen days increasingly probable.

Ultimate Prognosis.—This depends mainly on the heart, but it is also important to know how often the attacks will recur and what is the chance of fibrillation becoming established. A first attack is less likely to remain the only one if there is heart disease, and fibrillation is more likely to become established if there has been rheumatic carditis. The frequency of attacks is more variable, for there are patients with fibrillation present a large part of the time, and others with only a few attacks in several years, and yet others in excellent health after an interval of freedom of many years; even then, attacks may recur.

In general there is a tendency for these paroxysms to become more troublesome with the passage of time by a gradual increase in their frequency or more suddenly by fibrillation becoming established. But attacks may continue for long periods without any increase in frequency. One man has had four or five in each of the last ten years, and two others have had eight and four fairly evenly distributed throughout the same period. Occasionally the frequency may decrease even apart from treatment.

When there are not more than one or two attacks a month the prognosis is good, and the incidence need not increase. When the attacks are very frequent, fibrillation is likely to become established; but, even when they are so frequent and irksome that established fibrillation seems preferable, it is not always easy to bring about this change with digitalis (see below).

Liability to Established Fibrillation.—During a period of years fibrillation will become permanent in about a quarter of the cases. In our cases it became established in half of those with rheumatic hearts, but only in a tenth of those with normal hearts, and in about a quarter of the remaining groups.

(1) Where there had been the usual recurrent attacks, ætiology did not make so much difference, for fibrillation became established in about 15% of each group, except that with a normal heart the proportion was much less. The average interval since the first attack was three years in those with rheumatic hearts, and from five to eight years in the remainder.

(2) Where there had been attacks only for a short time before the permanent onset, they were few but often lasted unusually long, as though fibrillation had just failed to become established then. The average time elapsing here between the first attack and established fibrillation was a year, and in 12 cases it was less than six months.

Parkinson and Campbell (1930) concluded that paroxysmal fibrillation was a troublesome rather than a serious complication, and that the ultimate outlook depended mainly on the heart but also on the chance of fibrillation becoming established. Orgain et al. (1936) thought the prognosis of those with normal hearts was, with rare exceptions, excellent. Cooke and White (1942) increased their cases to 88 and traced 78 of them; they conclude that below the age of forty paroxysmal fibrillation may be considered as having no prognostic significance, but in later life may sometimes be the first sign of serious heart disease.

In general terms, one can say that the prognosis is that of the heart condition, only slightly modified by the paroxysms. It is possible that the heart is healthy, but in the patient who is older at the start of the paroxysms special care must be taken to be sure that they are not the first indication of heart disease.

Paroxysmal Auricular Flutter

Whether established or paroxysmal, flutter is less common than fibrillation in the proportion of about 1 to 20. I have not found any paper dealing systematically with a long series of cases of paroxysmal flutter; hence my conclusions must be more tentative. Many papers deal with auricular flutter as a whole, and in some respects it is hard to disentangle conclusions about the paroxysmal and established forms. A quarter of all cases of flutter are paroxysmal, and an eighth of the established cases have been paroxysmal before the rhythm becomes established. In about a third of the cases paroxysmal fibrillation alternates with paroxysmal flutter.

ÆTIOLOGY

The series all agree in the very small proportion who have not got organic heart disease, but Parkinson and Bedford (1927) found about 10% with hearts otherwise normal. Orgain et al. (1936) have described 7 cases of paroxysmal flutter with hearts otherwise normal: 4 of these would clinically have been diagnosed as paroxysmal tachycardia, though even here attacks lasted sixteen days and six weeks in 2 cases before they were stopped with quinidine. On the other hand, McMillan and Bellet (1931) thought that none of their patients had normal hearts.

When the series of Campbell (unpublished), Parkinson and Bedford (1927), and McMillan and Bellet (1931) are combined, the ætiological incidence is rheumatic 26%, hyperpietic 15%, other myocardial 43%, thyrotoxic 6%, and normal 10%. Perhaps this understates the importance of thyrotoxicosis. The findings are similar to those for paroxysmal fibrillation, except that the general myocardial group is larger; rather odd and obscure cases are more common, and alcohol is a more important factor with flutter.

Sex and Age Incidence.—There is a much higher proportion of men than with the other arrhythmias, even ventricular tachycardia—more than 5 to 1. Of my cases 88% were over 40 when the paroxysms started, whereas with paroxysmal tachycardia 76% were under 40. In most series the highest incidence (60–70%) has been found between 40 and 70 years—i.e., in older patients than those with auricular tachycardia.

The ætiology and the age and sex incidence are so different from those of paroxysmal tachycardia that, even if the underlying mechanism of both rhythms were similar, some explanation of the different clinical pictures would be needed.

SYMPTOMS

Breathlessness, palpitation, weakness, faintness, and disinclination for effort are the main symptoms. Substernal pain is found in a quarter of the cases. Loss of consciousness occurs in a tenth, a higher proportion than in other paroxysms, generally due to the assumption of 1 : 1 rhythm and often caused by exertion. Embolism develops more often and, unless the rate is controlled with digitalis, congestive failure more quickly, probably because there are more often heart disease and a tendency to longer attacks. The same classification into three groups suggested for paroxysmal fibrillation is also useful for flutter.

DURATION OF ATTACKS

Ritchie (1914) said that attacks might last minutes, hours, days, or weeks. Longer attacks are more common than with the other paroxysms, and the change to established flutter takes place more often. Parkinson and Bedford (1927) considered it established if it

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lasted fourteen days; McMillan and Bellet (1931) found the duration ten days or up to six weeks. The fact that digitalis treatment was introduced so early and is so often effective makes it more difficult to draw a line between the paroxysmal and established forms.

PROGNOSIS

The prognosis depends on the heart disease and can often be judged by the speed with which congestive failure follows the onset of flutter. The presence or absence of heart disease has no effect on the chance of restoring normal rhythm with quinidine or digitalis but influences the chances of maintaining it. Cooke and White (1942), following up some patients with normal hearts, found them still in good health from seven to thirty-two years later.

(To be concluded)

THE DELAYED IMMUNITY RESPONSE

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THE goal to be aimed at in any scheme of prophylactic active immunisation is the production of a permanent level of antitoxin concentration, sufficient to neutralise any toxin produced in the early stages of infection, and such a degree of potential immunity that a rapid production of antitoxin will ensue, sufficient to neutralise all toxin, however severe the infection.

Experiments made by us during the past 10 years have brought to light two observations that bear on these points: first, it is possible so to immunise an animal that the production of antitoxin continues almost indefinitely; and secondly, the injection of an antigen into a potentially immune animal may give rise to two types of response in the same animal, the secondary response being often followed by what we may describe, for want of a better term, as a delayed response. The rapid rise in antitoxic value during the first 10 days after a second injection is followed by a fall for about 2 months, after which the antitoxic titre may steadily rise again for several months.

Most of the early work by Glenny and Sudmersen [1] on immunity response was carried out with toxin-antitoxin mixtures as the primary stimulus; little work was done with toxoid either as primary or secondary stimulus, and none at all with the modern prophylactics T.A.F. or A.P.T. now in general use for human immunisation. The intervals between first and second injections were often several months, in contrast to the 4-weekly interval customary in human immunisation at present. Certain conclusions drawn by these workers therefore require extending, if not revising, in the light of recent experiments. Some of the data obtained by us may assist in the determination of the best methods of testing any new prophylactics and possibly throw some light on the requirements and conditions necessary for the satisfactory immunisation of children.

TABLE I—PERCENTAGE AMOUNT OF TETANUS ANTITOXIN REMAINING IN HYPERIMMUNISED HORSES ABOUT A YEAR AFTER THE LAST INJECTION

No. of immunisations	Percentage of antitoxin remaining	Interval since last injection (months)
41	87·9	13
13	15·4	12
6	6·0	17
5	8·3	12
3	5·5	11
2	1·4	14
1	2·3	12

1. Glenny, A. T., Sudmersen, H. J. *J. Hyg., Camb.* 1921, **20**, 176.

We have found that many horses used in the production of therapeutic serum continue to form antitoxin a very long time after specific immunisation has ceased.

In October, 1937, horse 7665 received an injection of 10 ml. of tetanus alum-toxoid, which was repeated 4 weeks later. These injections constituted the routine prophylactic measures used for all horses as a protection against accidental infection with tetanus.

For 2 years the horse was used for the production of anti-pneumococcus serum and in November, 1939, started courses of injections of tetanus toxin, continuing until April, 1945, and yielding during these $5^1/_2$ years a total of 1,190,000,000 international units of tetanus antitoxin from bleedings.

When the antitoxic titre had fallen to 1150 units per ml., tetanus immunisation was not pursued further, and the horse was used for other purposes. The last injection of tetanus toxin was given on April 13, 1945, and the antitoxic value on May 21, 1946, was 1000 units.

Thus after an interval of 13 months, during which no specific stimulation was given and 144 litres of blood was withdrawn, the antitoxic value was 87·9% of the value when injections ceased.

It is of interest to compare the rate of loss of tetanus antitoxin among horses less well immunised. Table I shows the correlation between number of immunisations and percentage of antitoxin remaining: the longer the immunisation, the more antitoxin remains; the two discrepancies in sequence in the second column are probably due to the differences in interval since the last injections (column 3).

Similar results have been obtained on a larger scale from horses hyperimmunised with diphtheria toxoid and toxin, and tested at short intervals after the cessation of injections. The average loss during the first few months was about 50% per month but was practically negligible after 6 months. Well-immunised horses contained 10–20% of the antitoxin present at the conclusion of immunisation 6, 12, or 18 months later, though they had received no further injections of diphtheria toxin and had had many 8-litre bleedings.

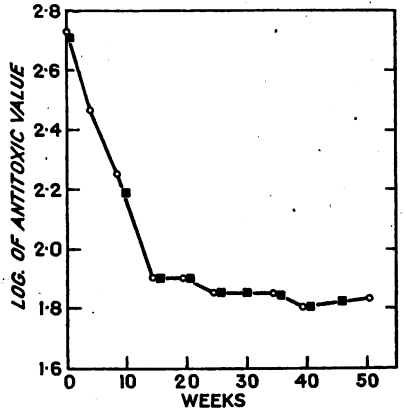

Fig. 1—Logs of diphtheria antitoxic content of a hyperimmunised horse during a year after end of the last immunisation: circles, observed antitoxic values; squares, occasions on which 24 litres of blood was withdrawn in 8 days.

Fig. 1 shows the antitoxic titre of a horse after hyperimmunisation with diphtheria toxin had ceased. About 42% of the titre was lost per month during the first 3 months of observation, reaching 15% of the original titre after 14 weeks.

After this there is an abrupt change in the shape of the curve, the antitoxic value never falling below 12% of that at the beginning of the experiment, from this time up to 50 weeks after the last injection of toxin. During this period 168 litres of blood were withdrawn from the horse.

It therefore appears that the production of antitoxin in a hyperimmunised horse may continue for at least a year after the last specific stimulus. It is of interest in this connexion to recall the findings of Glenny and Sudmersen [1] on immunising a guineapig with a single injection of a diphtheria toxin-antitoxin mixture. The antitoxic response of this animal was measured by means of tests on bleedings taken over 20 months, during which the guineapig gave birth to eight young. Despite this and the increase in weight of the animal and the fact that blood was withdrawn from time to time for titration,

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TABLE II—ANTITOXIC VALUES OF GUINEAPIGS, 10 DAYS AFTER THE SECOND OF TWO INJECTIONS OF DIPHTHERIA TOXOIDS, GRADED ACCORDING TO ANTITOXIC RESPONSE

Antitoxic value	No. of guineapigs			
	Grade A	Grade B	Grade C	Grade D
Under 0·001 unit ..	0	25	38	39
0·001 to 0·01 ..	0	19	4	11
0·01 to 0·1	9	16	13	2
0·1 to 1·0	64	91	35	4
1·0 to 10	96	84	2	0
Over 10	9	13	0	0
No. of animals ..	178	248	92	56
No. of toxoids ..	15	22	8	6
Median antitoxic value (units per ml.)	1·74	0·567	0·0504	Under 0·001

the authors found that "the total antitoxin present steadily increased for at least a year after the injection."

Since this time we have followed the course of production of antitoxin in several hundred guineapigs, used to measure qualitative differences in diphtheria toxoids. The guineapigs were injected with 2 Lf doses of various batches, reinjected after 4 weeks, and bled at fixed intervals thereafter, groups of 10 to 15 animals being used for each batch of toxoid. On the basis of the antitoxic titres of bleedings 10 days after the second injection, the toxoids were graded as follows:

(A) No antitoxic values under 0·01 unit per ml.
(B) From 1 to 3 per group under 0·01 unit.
(C) At least 3 under 0·001, but some over 0·2 unit.
(D) Not more than 1 per group over 0·1, and many below 0·001 unit.

The results of grading and numbers of guineapigs are given in table II. Median values are given rather than geometric means, because some titres are under 0·001 unit.

Fig. 2 shows the antitoxic titres of guineapigs bled at definite intervals after their second injection of antigen, and the titres shown as the median values for each group. Owing to the amount of labour which would have been involved, the guineapigs were not individually labelled. Most of the animals were obtained from outside dealers, and the death-rate was therefore relatively high over the whole period of the experiment. Fig. 2 includes curves for A.P.T. in doses of 1 Lf (curve 1) and 0·1 Lf (curve 4): curves 2, 3, and 5 represent the values of guineapigs immunised with grade A, B, and C toxoids respectively. The essential details calculated from the experiment are given in table III.

The toxoid curves 2, 3, and 5 show a preliminary drop in antitoxic value of 65–69% (the equivalent of 80–82·8% per month) from 10 days to 4 weeks, but the loss during the next 4 weeks is much less, being greatest with the best toxoids (grade A) and actually becoming an increase with group-C toxoids. In curves 2–5 a considerable increase is apparent at 24 weeks over that found at the lowest point at 4, 8, or 12 weeks; the amount of this increase ranges from 58% to 128%. No such result is shown in guineapigs injected with 1 Lf dose of A.P.T. (curve 1), a slight but steady drop being observed from the 4-week value to the conclusion of the experiment. It is not possible to calculate median values for guineapigs injected with grade-D toxoids, because too many titres are below 0·001 unit per ml.; figures calculated for several of these animals with values above 0·001 unit, however, give a curve similar to that obtained for grade-C toxoids (curve 5).

TABLE III—CHANGE IN ANTITOXIC VALUE OF GUINEAPIGS AFTER IMMUNISATION

Period		Calculated percentage change per month				
		Curve 1	Curve 2	Curve 3	Curve 4	Curve 5
10 days to 4 weeks	loss	65·5	82·2	82·8	38·2	80·0
4–8 weeks	loss	61·1	37·5	22·1	17·7	..
	gain	..	..	..	..	88·2
8–24 weeks	loss	26·7	..	..	..	15·8
	gain	..	66	128	28	..
Time (weeks) of lowest value ..		..	8	8	12	4
Percentage gain in value from lowest to 24 weeks		..	66	128	68	58

It is probable that the configuration of the curves for poor-quality toxoids C and D is due at least in part to the mixed population of responders among the guineapigs. Relatively high titres given by some guineapigs at 10 days, as a secondary response, had fallen before the intermediate response of other animals. This explanation cannot, however, apply to the curves for the A and B toxoids; among the antitoxic values of the A group at 10 days, none was below 0·01 unit and 95% were over 0·1 unit. Practically all these animals must have given a secondary response at 10 days, and following this there was a delayed response giving a second rise in value after 8 weeks.

Of guineapigs injected with B toxoids, only 10% had no detectable antitoxin and 75% had over 0·1 unit after 10 days. To conclude that the presence of two peaks in curve 3 was due to the existence of two populations of responders, it would be necessary to assume that this 75% of animals produced over 0·567 unit per ml. in 10 days, and that 65% of this antitoxin was lost in the next 18 days; little would remain after 24 weeks. The remaining 25%, more than half of which had shown useful titres after 10 days, would continue a slow production of antitoxin for 6 months, eventually reaching values appreciably higher than those reached by the good responders after 10 days. This is so improbable that this explanation can be rejected.

TABLE IV—CHANGE IN ANTITOXIC VALUE OF GUINEAPIGS FROM THE 8TH TO THE 12TH WEEK AFTER THE SECOND INJECTION OF TOXOID

No. of guineapigs	Geometric mean of antitoxic value at 8 weeks	Percentage change in value, 8th to 12th week
9	0·441	− 29·2
11	0·776	− 7·1
9	0·631	+ 9·3
5	0·0776	+ 20·3
10	0·431	+ 46·3
9	0·205	+ 54·5
11	0·340	+128·6

One experiment was made in which the titres of individual guineapigs were followed: these animals received an injection of 0·25 Lf dose of A.P.T. followed 4 weeks later by 0·1 Lf dose of toxoid. Tests on bleedings were made at about twofold differences—i.e., 0·1, 0·2, 0·5, 1·0, &c., units—thus small differences in titre would not be detected. It was found, however, that seven guineapigs out of eight showed a fall in titre to a half from 10 days to 4 weeks, and one did not fall to a half until 8 weeks. Of the seven animals surviving 6 months, three gave a twofold, and the remainder a greater, increase from 4 to 14 weeks. A further group of eight guineapigs received the same primary stimulus but 1 Lf dose of toxoid as secondary stimulus. Of these, seven showed a fall in value between 10 days and 4 or 8 weeks, the eighth remaining constant; five showed a rise from 4 or 8 weeks to 24 weeks, and three remained constant. When the secondary stimulus was increased to 10 Lf doses, four guineapigs out of ten showed a fall followed by a rise in value; in most of the others the values remained constant, and all were over 1·0 unit per ml.

It is possible that the deaths in the animals used in experiments shown in fig. 2 may influence results and

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render some conclusions unsound. Guineapigs dying from possible infections might well show a lower antitoxic value than those surviving the full 6 months; hence the median antitoxic value would tend to rise. An analysis has therefore been made of groups injected with 7 batches of grade-A toxoids, in which no deaths took place among 72 guineapigs between 8 and 12 weeks. The results are given in table IV.

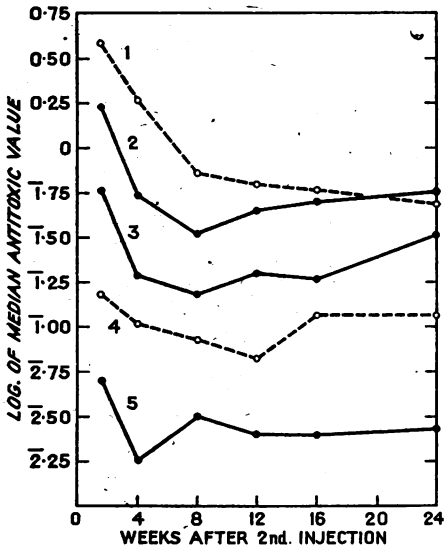

Fig. 2—Logs of median diphtheria antitoxic content of large groups of guineapigs bled at different times during 24 weeks after second of two injections given at an interval of 4 weeks: 1, 1 Lf of A.P.T.; 2, 2 Lf of toxoid grade A; 3, 2 Lf of toxoid grade B; 4, 0·1 Lf of A.P.T.; 5, 2 Lf of toxoid grade C.

Further, it might be that the curves in fig. 2 represent the result of a gradual primary response from the first injection with an independent secondary response superimposed. Against this, we have tested one batch of toxoid on four different occasions by giving guineapigs a single injection of 10 Lf doses, and obtained a median value of 0·00167 units per ml. 6 months later. The same toxoid was tested on four occasions by injecting 2 Lf doses repeated after 28 days, and the median value obtained at 6 months was 0·40 units per ml., the curve of antitoxic titre being similar to that of curve 2. This median value is very considerably higher though the total amount of antigen used was less than that used in the single-dose experiment.

We therefore conclude that the injection of 2 Lf doses of toxoid into guineapigs, already immune as a result of a previous similar injection, is followed by two independent responses in the same animal. In fig. 2, curve 1, where no rise in antitoxic value occurs after 4 weeks, there is a rapid reduction in the rate of loss, which may be due to the loss being partially compensated by increased production after 8 weeks.

It is difficult to explain these results on the basis of primary and secondary response. It appears possible to us that the two types of response (secondary and delayed) described here may be explained by differences in the degree of sensitisation of parts of the immunity-producing mechanism of the body. On this hypothesis, some proportion of the mechanism, depending on the nature and amount of the primary stimulus, would become sensitised in such a way that a further injection would produce a rapid rise—i.e., a secondary response—in antitoxic value. The same phenomenon would occur after any injections given subsequently. Other tissues requiring a bigger stimulus or a longer rest from further stimulation would not produce antitoxin rapidly but slowly and continuously, in contrast to the typical secondary rise and rapid fall. It appears from the results on tetanus horses that this capacity for slow-continued production is increased with length of immunisation.

As we stated previously, in human immunisation a state should be reached in which a child coming into contact with infection should possess sufficient circulating antitoxin to neutralise any toxin produced in the early stages and have sufficient potential immunity to bring into play a rapid production of much greater amounts of antitoxin. This would necessitate the establishment of a reasonably high antitoxic titre, maintained for several years as a result of the continued production, or delayed response, which we have described. Further, a sufficient proportion of the immunity-producing mechanism should be sensitised to the rapid type of production of antitoxin so that a secondary response, involving a very considerable rise in circulating antitoxin, would follow any infection. These considerations suggest that, when a new type of prophylactic is tested, Schick testing should be postponed until 4–6 months after the second injection in some of the test subjects.

SUMMARY

Antitoxin-production in animals continues for months or years after the injection of the last specific stimulus.

The injection of a toxin or toxoid into a potentially immune animal may give rise to two types of response in the same animal, the secondary response being followed by a delayed response in the form of a slow rise in antitoxic titre 2–3 months after injection.

There is a definite relation between the percentage of tetanus or diphtheria antitoxin remaining in the blood of hyperimmunised horses about a year after their last injection and the number of immunisations the horses have undergone. One horse, 13 months after its last injection, showed an antitoxic titre 88% of that observed when injections ceased. This animal had been under hyperimmunisation to tetanus for about 5½ years.

SALT METABOLISM IN ACUTE PORPHYRIA

REPORT OF TWO CASES

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THOUGH acute porphyria is one of the rarer diseases, Waldenström (1937) found it fairly often in Scandinavia, and more cases are being reported elsewhere as clinicians become more aware of the disorder and of the variations in the pigments which may occur with it in the urine. Kooy (1939) and Barnes (1945) have reported cases in South Africa.

It is now recognised that "acute" porphyria is a hereditary constitutional disease which may be latent or chronic, and that crises arise spontaneously (acute idiopathic porphyria) or may be precipitated by taking certain drugs, particularly sulphonal and the barbiturates (acute toxic porphyria).

The crisis has two phases. It starts by simulating an abdominal emergency, with diffuse crampy pain extending into the groins, and severe vomiting with constipation, or else an attack of stone, with pain in the back and "hæmaturia." There is often a peculiar psychical state which resembles hysteria, and the neurological aspect may be emphasised by the occurrence of temporary paralyses or blindness. Sometimes consciousness is impaired. Radiology and laparotomies have shown segments of dilated bowel, and lesions of the cœliac plexus have been described. The second phase is characterised by the development of an ascending paralysis of the Landry type, which often extends to the bulbar centres, leading to death from respiratory paralysis. More than half the victims die in their first attack.

The first necessity is to recognise the nature of the emergency and to apply such measures as are available to remedy the abdominal symptoms. A search for

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porphyrin may be suggested by the colour of the urine, but porphyrin is usually accompanied by many other pigments (porphobilin, skatole red, urofuscin, indole, and tyrosine derivatives), which make the expected easy recognition of the spectral bands of porphyrin difficult. The urine may not be abnormally pigmented when fresh, and porphyrin may not be present in recognisable amounts, but porphyrin may be identified by finding porphobilinogen or a porphyrin metal complex.

Porphobilinogen (Waldenström and Vahlquist 1939).—This precursor of porphyrin appears very constantly in the urine in porphyria. It contains two pyrrol groups, whereas porphyrin contains four in a ring. With Erhlich's aldehyde reagent it gives a red compound similar to that given by urobilinogen; these compounds have slightly different spectral bands and may be readily separated by extraction with chloroform, in which the urobilinogen compound is freely soluble, whereas the porphobilinogen compound is very insoluble in organic solvents. Porphobilinogen in urine does not give Schlesinger's reaction after oxidation; urobilinogen does. On being treated with acid, porphobilinogen forms a red pigment, porphobilin, which has a single spectral band at 500, and on further heating porphyrin can be obtained. Porphobilinogen is of great practical importance in the recognition of porphyria because of its constant presence and its easy recognition by the aldehyde reaction with chloroform extraction (Watson and Schwartz 1941).

Porphyrinogen (Waldenström 1937, Chandler et al. 1939).—This term was used for all the colourless substances which change to porphyrin on standing or heating the urine with dilute acid. Of these porphobilinogen is the most important.

Porphyrin Metal Complex.—This zinc compound gives the urine a red colour and a spectrum closely resembling those of hæmoglobin, but the supposedly blood-containing urine contains no protein or red cells and does not give the benzidine or guaiacum tests; acidification with hydrochloric acid changes the spectrum to that of acid porphyrin. This substance has probably caused considerable confusion in the separation of porphyria from hæmaturia.

When a porphyria is recognised, the risk of a fruitless laparotomy is avoided, but the problem of treatment remains acute. There is no fundamental remedy, for the basis of the disorder is uncertain. Waldenström (1937) compares the relationship of porphyrin to porphyria with that of uric acid to gout, and claims that, in both, the observed chemical changes are the signs of a more deeply seated metabolic disorder. Nesbitt (1944) has collected evidence that porphyrins may interfere with the autonomic nervous system, and Thorner (1937) records the case of a patient treated with a porphyrin compound who developed a severe peripheral neuritis. Spasm of the blood-vessels may be shown by hypertension and changes in the electrocardiogram, and Waldenström (1937) has observed contraction of the retinal vessels, with amaurosis.

Treatment must therefore be directed to the relief of pain, the correction of dehydration which may have followed the vomiting, and the use of glucose, insulin, vitamins, and liver extracts in the hope of doing good. Though treatment for dehydration is often applied, it does not appear to be recognised how severe is the disturbance of mineral metabolism in some cases, and that the rectification of this may be important in meeting the crisis. In the cases reported here the mineral metabolism suggested adrenal failure.

CASE-RECORDS

Case 1.—A European woman, aged 29, developed in *April, 1944*, an ulcer on her leg after an injury. It was treated with sulphanilamide powder and had almost healed in June. On *May 21* an itching vesicular eruption appeared on her hands; the vesicles burst and dried up, but the rash spread over the legs, forearms, and face. On *May 24* she had nausea and abdominal pain and began to vomit persistently. On *May 30* she had a vaginal discharge and tenderness in both fornices, and sulphadiazine was given for a possible salpingitis. After being given sulphadiazine 13 g. she developed tinnitus and deafness, swollen eyelids, and slight mental confusion; the drug was stopped.

On *June 3* the urine became very dark, and she had a convulsion, followed by coma. Examination revealed numerous scabs on arms, legs, and face, and a few new vesicles. No œdema or jaundice. Temperature 99°F, pulse-rate 100, respirations 30. Chest and abdomen normal. No vaginal discharge. Blood-pressure (B.P.) 110/58. Pupils, equal, reacted sluggishly to light. Fundi normal. Abdominal reflexes absent. Tendon reflexes present. Right plantar response flexor; left response indefinite. Urine: sp. gr. 1·014, dark port-wine colour, trace of albumin, acetone ++; porphyrin and urobilin present. Red cells 4,500,000 per c.mm., Hb 94%, white cells 11,300 per c.mm. (differential count normal). Cerebrospinal fluid (C.S.F.): colourless, no clot, protein 15 mg. per 100 ml., no globulin, chloride 540 mg. per 100 ml., normal sugar, no cells in 1 c.mm. Blood chemistry: serum-chloride 422 mg. NaCl per 100 ml., CO_2 content 52·4 volumes %; sodium 280 mg., potassium 22·6 mg., urea 44 mg., and protein 6·9 g. per 100 ml. Treatment was begun with intravenous saline and glucose, cortin and desoxycortone, and liver extract. Vomiting ceased.

June 4: B.P. 130/80; red cells 4,000,000 per c.mm., Hb 80%, white cells 6400 per c.mm. Patient could recognise relatives. Knee-jerks and ankle-jerks present; left plantar response extensor. *June 5:* improvement maintained; serum-chloride 515 mg. NaCl per 100 ml.; van den Bergh, direct negative; serum-bilirubin 0·5 mg. per 100 ml. *June 6:* improving; intravenous saline and glucose stopped; cortin given. *June 7–11:* Condition satisfactory; normal consciousness; patient took food with extra salt without vomiting; no cortical extract given. Pulse-rate rose from 80 to 100 on 8th and 120 on 10th. *June 11:* paræsthesiæ in arms and hands; tendon reflexes brisk in arms, feeble in legs. *June 12:* paræsthesiæ more intense; tendon-jerks much diminished in arms and legs; patient felt weak; B.P. 120/80; serum-chloride 436 mg. NaCl per 100 ml.; sodium 301 mg., potassium 18·8 mg., urea 59 mg., and protein 7·6 g. per 100 ml.; intravenous saline and cortin restarted. *June 13:* felt better; B.P. 140/90. *June 14:* sudden onset of rapid breathing, dyspnœa, and tachycardia, followed by death from respiratory failure in about 20 min.

Necropsy.—No gross disease. Suprarenal glands 16 g., no macroscopic or microscopic abnormality. Tubes and ovaries normal.

Urinary Pigments.—The urine contained a red pigment, which showed the spectroscopic bands of alkaline porphyrin and a red fluorescence in ultraviolet light. Ehrlich's reagent gave a strongly positive reaction; this was shown to be due to urobilinogen and porphobilinogen. Schlesinger's reaction ++. The porphyrin was adsorbed on kieselguhr as directed by Rimington (1943). It was insoluble in ether but soluble in ethyl acetate at pH 3. It was probably uroporphyrin III, but an attempt to prepare its methyl ester failed.

Case 2.—A European woman, aged 31, admitted to hospital on *Nov. 26, 1945*. She had had abdominal pain at intervals for a year, and for five days it had been very severe. It radiated from the loins into the iliac fossæ and down the legs. She had taken many medicines, including sulphanilamide, without relief. For a year the urine had been dark from time to time, and it had been thought to contain blood, but this had not been proved. No action of bowels since attack began; no vomiting. General condition poor; and she was drowsy at times. Temperature 99°F, pulse-rate 120, respirations 24. General tenderness of abdomen without local signs. Heart, lungs, and pelvic organs normal. Reflexes normal. Nothing abnormal noted in urine.

She became increasingly irrational, and her legs became weak.

Nov. 30: the urine became reddish-purple, and porphyrin was found. There was flaccid paralysis of both legs, with fair strength in arms. Tendon reflexes present in arms, absent in legs. Plantar responses flexor. Urine: trace of urobilin; no sugar, acetone, albumin, or bile. Red cells 5,510,000 per c.mm., Hb 86%, white cells 14,200 per c.mm. (polymorphs 89%). C.S.F.: protein 35 mg. per 100 ml., minute trace of globulin, chloride 562 mg. per 100 ml., CO_2 39 volumes %, sodium 310 mg. per 100 ml., 10 lymphocytes, 2 polymorphs, and 1080 red cells. Blood: icteric index less than 3; sugar 83 mg. and urea 137 mg. per 100 ml. Urine: chloride 1·55 g. per 100 ml.

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DEPLETION OF SERUM-CHLORIDE IN ACUTE PORPHYRIA

Case	Serum-chloride (mg. per 100 ml.)	Serum-CO_2 (vol. %)	Blood		Remarks
			Non-protein nitrogen (mg. per 100 ml.)	Urea (mg. per 100 ml.)	
Case 1.. ..	422	52	..	44–59	Persistent vomiting
Case 2.. ..	562*	39*	..	137	No vomiting
Roth (1935) .. case 1	437	..	280	..	Hypochloräemisch Uraemie
Nesbitt and Watkins (1942) case 4	476	..	..	54	Vomiting ++
Golden (1943)	482	33	66	..	Severe diarrhœa and vomiting
Nesbitt (1944) case 1	382	43	..	42	

* Cerebrospinal fluid.

Dec. 1: patient much more irrational and difficult to rouse; arms paralysed, and all tendon reflexes absent; respiratory distress. By noon the cranial nerves were involved and she was unconscious; death took place suddenly soon after.

Necropsy was delayed by legal formalities; no gross disease was found.

Urine.—Three bands of alkaline porphyrin were seen, and on addition of hydrochloric acid the bands of acid porphyrin appeared. Porphobilinogen reaction + +. Schlesinger's reaction feebly positive. The porphyrin was not soluble in ether.

In the families of neither patient was there any history suggesting porphyria, and the urines of accessible relations contained no porphyrin or porphobilinogen.

DISCUSSION

Two points of special interest arise in case 1—the relation of the sulphanilamide to the porphyria, and the meaning of the disturbances of mineral metabolism. Sulphanilamide was given in case 2 but was less likely to have been an important factor; again there was a very abnormal mineral picture.

That porphyrin was often found in the urine after treatment with sulphonamides was discovered soon after these drugs were extensively used. It accompanied the methæmoglobinæmia and was small in amount (Rimington and Hemmings 1938, 1939). Its occurrence depended on the quantity of sulphonamide taken and only to a small extent on the make-up of the patient; there were no symptoms referable to the porphyrin, which disappeared from the urine when the drug was stopped. It was an exaggeration of the normal excretion of coproporphyrin—a porphyrinuria, not a porphyria. In porphyria the abnormality is in the patient. The porphyrin excreted is uroporphyrin, and in acute porphyria it usually belongs to series III. If a drug is concerned it may have a trigger effect so that a few doses or even a single dose may provoke a crisis, or else after a long period of treatment with a drug a crisis occurs and as a rule will recur if ever the drug is given again.

It seems probable that sulphanilamide played a part in case 1. The danger of allergic sensitisation of a patient to sulphonamides by local applications has been shown by Tate and Klorfajn (1944) and by Park (1944), and it seems that the sensitivity is often to the sulphonamide group and not to the side-chain—therefore the patient is sensitised to the whole group of sulphonamides. It is very probable that the dermatitis was caused by sensitisation to the sulphanilamide applied to the ulcer, and that the general reaction after the sulphadiazine was due to sensitisation to the group. The sequence of events may have been latent porphyria, sensitisation to sulphanilamide, generalised allergic reaction to sulphanilamide and sulphadiazine, a crisis of porphyria; but it seems probable that the abdominal pain, diagnosed as salpingitis, was the beginning of the crisis of porphyria, and that the sulphadiazine merely added insult to injury. In the recorded cases of porphyria sulphonamides are under suspicion but do not seem to have been definitely incriminated; they have usually been given after the onset of the abdominal pain, but Nesbitt and Watkins (1942) record a case in which an acute attack followed treatment of an infected tooth socket with sulphanilamide.

A gross depletion of serum-chloride has been noted in several cases of acute porphyria (see table). This hypochloræmia has not been commented on and has presumably been attributed to the vomiting, for treatment has usually been directed to the correction of dehydration. Vomiting alone causes a fall of serum-chloride but as a rule it is accompanied by an increase of bicarbonate and alkalosis. In the cases of porphyria in which the data are given there is no increase in bicarbonate, and in some of them the bicarbonate is low. The possibility of an adrenal insufficiency will therefore bear examination.

The characteristic changes in the blood in adrenal insufficiency are hæmoconcentration; an increase in blood-urea; a decrease in serum-chloride and sodium, with normal or low bicarbonate; and an increase in serum-potassium. The urine contains chloride and sodium in considerable amounts. In Addison's disease there are also low blood-pressure, vomiting, weakness, and pigmentation. Investigations were carried out in case 1 to see to what extent these features were present, and a less thorough study was possible of case 2. As judged by the red-cell count, hæmoglobin, and serum-protein, the hydration of the blood was normal in case 1, but the red-cell count was high in case 2—5,500,000 per c.mm. The blood-urea was 44 mg. per 100 ml. in case 1, which is high for a woman aged 29, and 137 in case 2. In case 1 the serum-chloride was 422 mg. per 100 ml. (normal 560 +), and in case 2 the C.S.F. chloride was 562 mg. per 100 ml. (normal 700 +); a low amount of C.S.F. chloride indicates a proportionately low serum-chloride (Linder and Carmichael 1928). In case 1 the serum-sodium was 280 mg. per 100 ml. (normal 320 +), and in case 2 the C.S.F.-sodium was 310 mg. (normal 300–340), which indicated a normal serum-sodium level. In case 1 the serum-potassium was 22·6 mg. (normal 18–20). The serum-CO_2 in case 1 was 52 volumes % (normal 55–75) and the C.S.F.-CO_2 in case 2 was 39 mg. per 100 ml. (normal 42–56). In general these findings resemble closely those found in adrenal insufficiency.

Aitken (1929) has found that in experimental depletion of body salt in normal people there is a zone between 585 and 555 mg. of NaCl per 100 ml. of serum above which chloride excretion is considerable and below which it is reduced to a trace of about 5 mg. per 100 ml. of urine; he has emphasised that this zone may be different under other conditions, and that the body has a great capacity for retaining salt offered to it when in a depleted state. With a normal power of chloride conservation the urine of cases 1 and 2 should have been practically chloride-free. The urine of case 2, far from being chloride-free, contained 1550 mg. NaCl per 100 ml. Chloride was not measured in the urine of case 1 until after cortical extract and salines had been given; the excretion then was high. After her relapse on June 12 it was found that with a serum-chloride level of 436 mg. per 100 ml. the urine contained 540 mg. per 100 ml. and 3·1 g. was excreted in the day. There was therefore in both cases a definite failure to conserve chloride.

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Such a failure to conserve chloride with a low serum-chloride level is not confined to adrenal failure. It may occur occasionally in diabetic and nephritic acidosis. It is probably usual in respiratory diseases severe enough to lead to "free CO_2 excess"; the compensation for this deviation of acid-base balance is an increase of serum-bicarbonate at the expense of serum-chloride, the total base remaining unaltered. This low serum-chloride level can only be established and maintained by the excretion of chloride in the urine. It has been found in emphysema and sometimes in tuberculosis (Winkler and Crankshaw 1938, Thorn et al. 1940). With the vomiting of pyloric obstruction there is a loss of hydrochloric acid, which leads to a state of alkalosis with high serum-bicarbonate and low serum-chloride levels; in the urine there is usually little chloride and sometimes much bicarbonate, the chloride reappearing promptly when the serum-chloride level is restored (Anderson and Lyall 1937). In the present and similar cases there was no evidence of respiratory weakness when the low serum-chloride level was discovered. Vomiting did not occur in case 2. In case 1 it was a prominent feature, but the absence of alkalosis at least suggests that the hypochloræmia was not established by vomiting alone. In neither case was there diarrhœa or constant albuminuria; so a combination of vomiting with alimentary or renal acidosis is unlikely. The retention of urea was an extrarenal azotæmia, but one of the characteristics of this when not of adrenal origin is the small amount of chloride in the urine (Zondek 1946). In severe disturbances of acid-base metabolism excretion of chloride may occur in spite of depleted serum-chloride, but there was no such grave acidosis in these cases.

The result of treatment with cortical extract and salt was excellent in case 1. Before this she was comatose and vomiting continually; in a few hours consciousness began to return and vomiting ceased, and in three days she could take normal food with extra salt. The subsequent development of progressive neuritis was an independent event, but the low serum-chloride level at that time suggests that the need for cortical therapy had not passed or had returned.

Pigmentation was absent in these patients, but Muller (1894) and Roth (1935) have described cases of porphyria with pigmentation similar to that of Addison's disease, and Waldenström (1937) records pigmentation which he thought might be of adrenal origin, though he could not obtain other evidence of adrenal disorder. Campbell (1898) reported degeneration of the epithelial cells of the cortex in a case of porphyria, and Geissler (1939) found "Starker Lipoidgehalt der Rinde" in another.

The suggestion of a functional adrenal insufficiency is not altogether fanciful. Hypertrophy of the glands, and changes in the urinary excretion of 17-ketosteroids and other cortical waste products after infections, burns, and operations, give a firm basis to the assumption that in such conditions a large demand is made on the adrenals (Albright 1943, Shipley and Dorfman 1946). That in porphyria a similar demand is made is not unlikely, and it appears from the present cases that sometimes it cannot be met, and that a state of relative adrenal insufficiency ensues.*

The prognosis of acute porphyria is grave, for there is no known way of stemming the progress of the neuritis. The death-rate is very high, and of those who survive the initial attack many succumb within a year; a few however do survive for years—one for over 35 years (Waldenström 1937)—therefore any contribution to the successful treatment of the acute attack has some value, and it is suggested that cortical therapy and salt are worthy of a further trial in suitable cases.

* Since the completion of this paper Abrahams et al. (1947) have published a case of porphyria with features of adrenal insufficiency. This patient's serum-chloride was 380 mg. per 100 ml. and the sodium 248 mg. per 100 ml.; she was treated with cucortone and salt.

SUMMARY

The mineral metabolism of two patients with acute porphyria suggested a state of functional adrenal failure, and encouraging results were obtained in one case with cortical extract and salt.

In one case the porphyria followed allergic sensitisation to sulphanilamide.

I wish to thank Prof. F. Forman and Dr. M. Horwitz for their help in studying these cases.

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SPONTANEOUS RUPTURE OF SPLEEN AFTER DEFÆCATION

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SPONTANEOUS rupture of a diseased spleen has often been recorded, most commonly in malaria and typhoid, less commonly in leukæmia, Banti's disease, Hodgkin's disease, syphilis, tuberculosis, amyloid disease, and kala-azar. Susman (1927) collected additional cases due to hæmophilia, acute infections, typhus fever, relapsing fever, cystic degeneration, infarction, sarcoma, abscesses, and hydatid disease.

The commonest cause of ruptured spleen in this country is trauma, which causes either immediate shock or signs of intra-abdominal hæmorrhage; the rupture may not occur until several weeks after the accident. Jackson (1925) reported a case of rupture occurring 28 days after injury. Very slight trauma, such as the flick of the fingers under the left costal margin, may suffice to rupture a malarial spleen—a fact made use of in certain countries by would-be assassins.

Spontaneous rupture of an apparently normal spleen is much rarer. The term "spontaneous" is obviously difficult to define but is here intended to imply rupture in the absence of trauma. Zuckerman and Jacobi (1937) collected 28 cases of spontaneous rupture of a normal spleen, regarding 21 of these as genuine and 7 as doubtful.

In some other cases rupture was preceded by some physiological effort, such as bending to lift a heavy weight (Susman 1927), coitus (Stretton 1926), pregnancy (Hubbard 1879), and labour (Schwing 1880). Burnett and McMenemey (1935) reported cæsarean section and splenectomy in a 16-para whose spleen had ruptured

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when she stretched backwards and upwards to turn out a light; eighteen months later she gave birth to her 17th child. In the case reported by Watson and Ferdeber (1942) the patient was awakened from sleep by the sudden abdominal pain.

The following case is the first reported in which rupture followed the effort of defæcation.

CASE-RECORD

A German prisoner-of-war was admitted to hospital on May 31, 1945, with a history of vague indigestion for two

Macroscopical section of spleen showing hæmorrhages (just under life size).

weeks, with a sudden onset of acute pain five minutes after defæcation.

On examination he was not much shocked; pulse-rate 92, temperature normal. His face did not have the worried appearance usually seen in gastric perforations. There was board-like rigidity of the abdomen and much tenderness in the hypogastrium. The pain seemed to be slightly worse on the right of the midline. A more exact history was not obtained until later (see below), owing to language difficulty, but a diagnosis was made of perforated gastric ulcer.

Operation.—Under gas, oxygen, and ether anæsthesia, a right paramedian incision was made, splitting the rectus muscle. The abdominal cavity contained a little blood-stained fluid. No abnormality of stomach or duodenum was found. A small tear was seen in the liver, but this was possibly the result of too enthusiastic retraction; it was certainly not enough to explain the hæmoperitoneum. On passing the hand into the abdomen, a large soft blood-clot was discovered in the left flank, and a soft mass was felt protruding from a break in the capsule of the spleen.

The original incision was enlarged parallel to the lower left costal margin, thus cutting a portion of the right rectus, and the whole of the left. The spleen was delivered and removed. The wound was closed without difficulty and healed well, and the patient made an uninterrupted recovery with three weeks in bed.

Investigations.—Blood-count on the morning after operation: red cells 5,000,000 per c.mm., Hb 90%, white cells 16,700 per c.mm. (polymorphs 85%, lymphocytes 6%, monocytes 9%, basophils and eosinophils less than 1%). No abnormal white cells were seen. Red blood-cells appeared to be normal.

The spleen was normal in size, being $3^1/_2$ in. long, 2 in. wide, and $1^1/_2$ in. thick at its centre. The capsule on the anterior surface was ruptured, and from the small tear in the pulp a blood-clot was exuding. On cross-section the appearance was as shown in the accompanying figure.

Dr. H. J. Barrie, pathologist to the Royal Hospital, Sheffield, reported: "The splenic capsule, malpighian bodies, and blood-vessels appear normal. The pulp is for the most part contracted and therefore appears very cellular, but its component cells appear normal. Finger-like hæmorrhages seem to traverse the spleen without any relation to its anatomical structure. They are all recent. The red cells are for the most part bordered by normal pulp or separated from it by a narrow rim of fibrin. In the hilum one hæmorrhage has an outer zone of laminated thrombus. This hæmorrhage probably antedated the others but could not have been more than a day or so old, for surrounding erythrophagocytosis is very slight, though there is considerable polymorphonuclear reaction. None of the hæmorrhages has caused marginal increase in hæmosiderin, and the pulp contains only scanty intracellular hæmosiderin. No Leishman-Donovan bodies seen. The histological picture throws no light on the origin of the hæmorrhages."

Events preceding rupture.—During convalescence the patient gave a few more details. For three weeks before the operation there had been small vague pains in the left loin, particularly at night, but not severe enough to cause him to report to the doctor. Two years previously, during the bombing raids on Germany, he had been hit by falling masonry, which had caused bruising of the right leg and slight concussion, but no abdominal bruising or injury. He had never had malaria or any other serious illness, and he confirmed the fact that the acute pain followed a normal act of defæcation. At the time he was not constipated.

DISCUSSION

Kehr's sign of radiating pain to the right shoulder is pathognomonic of a ruptured spleen but was absent in this case. Ballance's sign of increased dullness to percussion in the left flank, seldom shifting when the position of the patient is changed, was not looked for.

Trendelenburg (1918) stated that vomiting was a constant sign of rupture of the spleen, but it was absent in this case and in 16 of the 28 collected by Zuckerman and Jacobi (1937). Kehr's sign occurred in only 3 of their cases.

In the present case and in 5 of those collected by Zuckerman and Jacobi there was a history of indigestion before the rupture. Rupture was possibly due to increase in pressure in the portal vein.

The spleen in my patient resembled that described by McCarthy and Knoepp (1944). The pulp contained dark purplish-red circular and ovoid hæmorrhagic nodules, varying in diameter from a few millimetres to 2 cm. Histologically, a diagnosis of multiple hæmangiomata of the spleen was made.

My thanks are due to Mr. D. Brady for the histological sections, and to Mr. A. L. Watson, M.S.R., for the photograph.

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PSEUDOMONAS PYOCYANEA MENINGITIS FOLLOWING SPINAL ANALGESIA

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ACCOUNTS of meningitis following spinal analgesia are infrequent because of "a natural reluctance to report what should be a preventable happening" (Kremer 1945). But I feel that the conscientious recording of such cases is important, if only to emphasise the possible dangers of the method and keep in everyone's mind the importance of a rigid technique in asepsis both in the preparation of the syringes and ampoules and by the administrator.

Kremer reported 7 cases, 1 of them fatal. Evans (1945) described 2 fatal cases due to *Ps. pyocyanea*. More recent examples are those of Vuylsteke (1947) and the Portsmouth case (*Lancet* 1947).

My own experience is as follows. On April 16, 1945, three hernial repairs were carried out under spinal analgesia. The first patient, aged 41, made an uninterrupted recovery; the second, aged 19, developed meningitis from which he subsequently recovered; and the third developed meningitis from which he died sixteen weeks later. The details of the 2 cases of meningitis were as follows.

CASE-RECORDS

Case 1.—An air fitter R.N.A.S., aged 19, underwent on April 16, 1945, a Willys-Andrewes modification of a Bassini

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repair of a right oblique inguinal hernia under spinal analgesia with 3 ml. of 5% 'Planocaine' given in the right lateral position. From the evening following operation he had severe headache. There was no nausea, vomiting, or diarrhœa. On the 19th head-retraction and Kernig's sign developed. Lumbar puncture revealed a turbid cerebrospinal fluid (C.S.F.) at a pressure of 90–100 mm. of water. Examination of the C.S.F. showed 1500 polymorphs per c.mm., and culture yielded a growth of *Ps. pyocyanea*. Patient was given sulphadiazine in full doses on the 18th, and after the finding of the organism in the C.S.F. a ketogenic diet was given in the hope that aceto-acetic acid in the C.S.F. might inhibit the organism, even as 1% inhibits it in the bladder or in an open wound. On the 20th lumbar puncture was repeated and 10 ml. withdrawn. Penicillin 50,000 units was given intrathecally.

In the meantime the organism was tested in vitro against penicillin and all the sulphonamides, either alone or in combination; none made any appreciable difference to its growth except sulphamerazine. On the 27th sulphamerazine was given, starting with eight tablets of 0·5 g. and continuing with two tablets every four hours. Lumbar puncture was repeated on the 22nd, 26th, and 30th and on May 10. On April 30 there were only 129 cells per c.mm., and there was no growth on culture. On May 15, because of a tendency to leucopenia, the drug was reduced to 1 g. eight-hourly. The drug was discontinued on the 23rd and the patient, being symptom-free, was allowed up. On the 25th the ophthalmologist reported that the optic disks were clear. On June 6 the patient was discharged to his unit.

Case 2.—A private, aged 18, underwent on April 16, 1945, a Bassini repair of a right oblique inguinal hernia under spinal analgesia with 3 ml. of 5% solution of planocaine administered in the right lateral position. He had headache, diarrhœa, and vomiting after operation and was given a full course of sulphadiazine starting on the 18th. Next day lumbar puncture revealed a turbid C.S.F. under pressure, and by this time he had developed head-retraction. Examination of the C.S.F. showed 3500 cells per c.mm., mainly polymorphs, but there was no growth on culture. On the 20th lumbar puncture was repeated, 10 ml. of fluid withdrawn, and penicillin 50,000 units given intrathecally. The fluid from this puncture contained 940 cells per c.mm., and there was still no growth on culture.

Ps. pyocyanea was first isolated on May 2, but on April 27 sulphamerazine was given, starting with eight tablets of 0·5 g. and two tablets thereafter four-hourly. The dosage was modified as the white-cell count became lower and then increased as symptoms required. By May 11 there were only 14 cells per c.mm. in the C.S.F. and one colony of *Ps. pyocyanea* in serum agar. On the 23rd there was no growth on culture. The patient's general condition was, however, deteriorating, and a week later there was a further growth of the organism on culture. In spite of further sulphamerazine the clinical condition of the patient worsened, and he died on Aug. 5.

Necropsy revealed a tense dura on removal of the skull cap. Both cerebral hemispheres were flattened by hydrocephalus, but there was no pus over either hemisphere. Pus was found surrounding the medulla, pons, and inferior surface of the cerebellum. The brain was removed, and thick greenish pus was found in the lateral and fourth ventricles. There was obstruction of the aqueduct of Sylvius and foramen of Monro, with internal hydrocephalus. No abnormality was found in the thorax or abdomen.

COMMENTS

An exhaustive attempt was made to trace the source of the infection in these cases, but without success. Cultures were made from the glove powder, sterile water, and air of the theatre, but no trace was found of *Ps. pyocyanea*. A possible source of infection was thought to be the patient's skin, but cultures from the skin of the back on May 11 yielded only *Staph. albus*.

Undoubtedly the second patient died mainly because the internal hydrocephalus and basal meningitis gave no chance of drainage; but one is forced to the conclusion, already expressed by others, that meningitis following lumbar puncture with or without introduction of a solution for spinal analgesia will be avoided only by the maintenance of a scrupulously careful aseptic technique which must apply to the whole theatre.

The only other case of meningitis following spinal analgesia which has occurred in this area during several years was in a patient operated on in the same theatre; and in this case *Ps. pyocyanea* was cultured from "sterile" water in a winchester jar.

SUMMARY

Two cases of *Ps. pyocyanea* meningitis following spinal analgesia are described. One patient recovered after treatment with sulphamerazine; the other died.

The source of the infection could not be traced; but in a similar case (not described here) the source was so-called sterile water in the operating-theatre.

Emphasis is laid on the importance of a rigid technique of asepsis in lumbar puncture, whether for diagnostic or anæsthetic purposes.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Renal Circulation

AT a meeting of the section of experimental medicine on Oct. 21, Dr. A. E. BARCLAY (in the absence of Prof. K. J. FRANKLIN) outlined the development of the radiological techniques which have been applied to the study of the renal circulation. The work originated in experiments by Barnes and Trueta, who set out in 1942 to determine whether protracted constriction of a limb could cause persistent spasm of its main arteries. A tourniquet was applied to one of the hind legs of an anæsthetised rabbit to exert pressure on the femoral vessels for several hours. Angiograms of both limbs were made at various intervals after the removal of the tourniquet. In some animals the spasm was localised to the vessels of the affected limb, in others the vessels of the other limb also were in spasm, and in one animal there was well-marked spasm *above* the level of the tourniquet. Other studies on the circulation undertaken at the Nuffield Institute in cats, rabbits, and the sheep fœtus provided a technique suitable for demonstrating all the abdominal vessels in the intact animal in the later investigations. In these further tourniquet experiments, by the injection of thorotrast into the external jugular vein and by direct cineradiography, it was found that prolonged application of a tourniquet to a thigh resulted in arterial spasm involving not only both femoral arteries but also the aorta and extending proximally to include the renal arteries. In such experiments suitably timed angiography showed diminution in the calibre of the renal arteries and pronounced dilatation of the renal veins—by contrast the mesenteric artery was unaffected. The changes noted in the renal vessels in these tourniquet experiments were reproduced after stimulation of the central end of the cut sciatic nerve. Thus the constriction of the renal arteries was considered to be a reflex reaction to afferent impulses with the efferent pathway located most probably in the splanchnic nerves. Bilateral section and degeneration of the splanchnics was followed by dilatation of the renal vessels and mesenteric artery, and in tourniquet experiments performed on animals so treated these vessels remained unaffected while the limb vessels were constricted. Finally, faradic stimulation of the left splanchnic nerve yielded results closely comparable to those from tourniquet experiments or after effective sciatic stimulation and gave final proof of the rôle of the splanchnic nerves in the reflex vasoconstriction.

When taking angiograms during these experiments, Dr. Barclay explained, it was customary to make two exposures at carefully timed intervals, to show the thorotrast first in the renal arteries and then in the veins. In some angiograms of the renal arteries, in tourniquet experiments, a certain amount of the contrast medium was noted actually in the renal veins. Further observations on this point by direct cineradiography showed the renal circuit-time much altered from the normal: from the control circuit-time of 2·7 sec. before the experiment to 1·8–2·1 sec. during the application of the tourniquet,

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with a still further reduction to 1·5–1·65 sec. at 15 min. and 1·5 hours after its removal. There was a corresponding constriction of the renal artery and dilatation of the renal vein, and so the presence of a "shunt" or short-circuit was suspected. This led to a study of the circulation within the kidney to ascertain where the short-circuit was taking place.

Continuing the account of this work, Dr. JOSEP TRUETA said that after inconclusive radiographic results in one experiment in which the central end of the cut sciatic nerve (left) was stimulated, methylene-blue was injected into first the left and then the right renal arteries. The result was quite unexpected. The kidney on the unstimulated side (right) was uniformly stained, that on the stimulated side (left) showed on the surface only a few small scattered dye spots. On radial section the difference was much more striking—on the left side the deep cortex and medulla alone were stained; the outer cortex was not stained. This gave a clue to the level of the short-circuit, and everything now pointed to the operating mechanism being a neurovascular reflex. Thereafter followed studies of the intrarenal circulation by microradiographic, histological, and several injection techniques. By the integration of these, the complete and the "lesser" renal circulations were demonstrated and the latter shown to be the normal medullary circulation, sustained by the large glomeruli of the boundary zone—that is, the juxtamedullary glomeruli and their efferent vessels, sometimes also called the vasa recta (spuria). These experimental findings seemed to indicate that the kidney might be regarded as having two functionally separate parts, the cortical and the medullary; Dr. Trueta also stressed the high proportion of vasa recta to the loops of Henle, which suggested that the vasa recta have a functional significance. He then described the demonstration of the circulation in experimental renal cortical necrosis; cessation of the circulation in the affected outer cortex and its continuance through the juxtamedullary glomeruli to the medulla was clearly similar to the medulla-diverted circulation in tourniquet experiments, and in experiments on sciatic-nerve and splanchnic-nerve stimulation. He ended by demonstrating the formation of vasa recta vera in arteriosclerotic and hypertensive human kidneys by stages in a series of exquisite 'Neoprene' preparations.

Dr. J. F. HEGGIE gave an account of his studies in the measurement of the renal circulation-rates in the normal rabbit and in rabbits in which cortical necrosis had been produced by intravenous injection of staphylococcus toxin. He illustrated (by filmstrip) the normal vascular channels in the kidney and emphasised the essentially glomerular nature of the circulation. From observations on the structure, volume, and number of the glomeruli and on the total renal blood-flow it had been calculated that the normal glomerular capillary volume was changed five times each second (if all glomeruli were functioning, as possibly they were) and the velocity in each glomerular capillary loop was probably at least 1·25 mm. per sec.—i.e., higher than the average capillary rate elsewhere (0·5–1·0 mm. per sec.)—but this was not surprising in view of the fact that the glomerular capillaries were interposed between arterioles and the pressure in them was high. In renal cortical necrosis of toxic origin the initial lesion (with the doses employed) was demonstrated to be an inflammation of the glomeruli in the strict sense, proceeding through capillary hyperæmia, slowing of the flow and diapedesis, to stasis in the cortex save in the boundary zone where the glomeruli, increased fivefold in volume, maintained an augmented flow at approximately normal rate (velocity). This was a clear demonstration of the blood-supply to the renal medulla, and to the concerned glomeruli he had in 1941 given the name *juxtamedullary;* and from these findings he had indicated to the workers in Oxford that the short-circuit they had discovered and demonstrated in vivo was via these juxtamedullary glomeruli. These changes marked one extreme of a wide range; at the other were the normal variations of the renal circulation, and between were alterations which occurred in a variety of conditions, with varying degrees of derangement of filtration and reabsorption rates, and of electrolyte and urea retention; these required further study.

Dr. E. M. DARMADY had studied about 1000 cases following injury or crush injury and had found certain lesions histologically which appeared to fit in very well with the circulatory findings just described—relative ischæmia in the renal cortex, congestion of the juxtamedullary area, and engorgement of the vessels in the medullary zone. He considered, however, that it was unwise to translate directly the findings in the rabbit to man at this stage, particularly as he knew from his experiments that the renal pedicle in the rabbit was very sensitive to traction and that ischæmia readily resulted.

Mr. R. H. PARAMORE was interested in alterations of the renal circulation particularly in relation to urinary secretion, to which no reference had been made. Several years ago he had reported in the *Proceedings* of the society that when the ureters were clamped the kidney became almost bloodless. He had ascribed the relative ischæmia of the cortex which occurs in eclampsia, despite the hypertension, to increasing back-pressure, which, within the kidney, brings about diminution of the renal circulation-rate and blood-flow, through the agency of the pressure of distended tubules.

Prof. H. P. HIMSWORTH had been studying the intralobular circulation of the liver in dietetic deficiency experiments and had seen a few hæmorrhages occur in the portal tracts as the initial stage of necrosis; by following the stages of these circulatory changes he had concluded that the hæmorrhages resulted from swollen liver cells damming back the blood in the portal system. The relation to the kidney was that these hæmorrhages could be produced in rats of 40–50 g. (only). At a recent meeting in New York, Dr. Baxter of the Best Laboratory, Toronto, showed pictures of the circulation in the kidney after the injection of choline into the circulation of these choline-deficient animals. There was great swelling of the cells of the tubules, and these pressing on the intertubular capillaries had obstructed the circulation and so dammed the blood back that small hæmorrhages resulted.

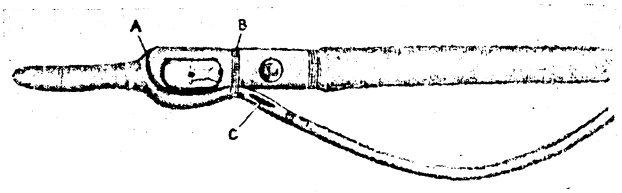
Dr. TRUETA, in reply, said that this work was but a new beginning to the numerous investigations necessary for a fuller understanding of kidney function.

New Inventions

COMBINED GASTROSCOPE AND SUCTION TUBE

IN many instances gastroscopy would be facilitated if it were possible to use aspiration, especially if the aspirating tube could be directed to and held at a particular spot or point while continuously under direct vision. We describe here a simple method of making a sucker attachment to the Hermon Taylor flexible gastroscope; it is not bulky, does not affect passage of the gastroscope, does not become detached while in use, and is safe and easy to manipulate.

A Ryle's duodenal tube 36 in. long is used. The terminal 1–1½ in. is cut off; this removes the lead shot, which, if left in place, would make the instrument unduly



Combined gastroscope and suction tube: A, junction between new tip of gastroscope and lamp; B, lashing of Ryle's tube to gastroscope; C, new aperture made in Ryle's tube.

bulky. The tube is now laid alongside the gastroscope and glued lightly in place with rubber solution, such as is used in repairing rubber gloves. The terminal part of the Ryle's tube and the flexible rubber tip of the gastroscope (it is necessary to use a lamp with a rubber finger-tip and not a rounded metal end) are then firmly bound together with fine silk thread by whipping. The thread is then covered with rubber solution. A slit finger from

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a rubber glove is then placed over the gastroscope tip and terminal end of the Ryle's tube and is glued in position, its edges being carefully trimmed to leave a perfectly smooth surface and a smooth junction between the new gastroscope tip thus formed and the lamp (see figure). The Ryle's tube is then tightly bound to the gastroscope with silk thread just proximal to the lamp, shutting off the lumen of the Ryle's tube from the holes in its end. A new hole is now cut with curved scissors immediately adjacent to the lens of the gastroscope.

It is unnecessary to attach the Ryle's tube to any other parts of the gastroscope; attempts to do so lead only to dangerous surface projections and to occlusion of the Ryle's tube. While the gastroscope is in use, the proximal end of the Ryle's tube must be kept closed with a spigot. If this is not done, each time air is introduced into the stomach with the blower some of it will escape up the Ryle's tube, tending to deflate the stomach when inflation is desired.

Some of the advantages of using this instrument are as follows:

(1) Intubation and emptying of the stomach before gastroscopy, even in the presence of pyloroduodenal obstruction, is eliminated, any aspiration necessary to obtain a clear field being done at the examination and under visual control.

(2) Doubtful spots on the mucosa, covered by exudate under which may lie an ulcer or erosion, can be exposed by manipulating the hole in the Ryle's tube to the site and applying suction. If this fails, a syringe containing air can be attached to the proximal end of the Ryle's tube, and a stream of air can then be directed to the spot and used to dislodge the mucus.

(3) In some patients who have had partial gastrectomy or gastro-enterostomy performed the gastroscopist's vision is obscured by regurgitation into the stomach from the jejunum. The introduction of more air leads, as often as not, to the formation of bubbles further obscuring the field. Aspiration, continuous or intermittent, will expose the stoma to view.

(4) Under various stimuli—e.g., histamine and insulin—the behaviour of the actively secreting mucosa can be viewed, while at the same time specimens can be removed, continuously or intermittently, as desired.

We are indebted to Miss Prudence Craig for drawing the diagram.

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Reviews of Books

Food Poisoning

(2nd ed.) ELLIOT B. DEWBERRY, F.R.S.I. London: Leonard Hill. 1947. Pp. 246. 17*s.* 6*d.*

FOOD hygiene is an important part of preventive medicine, and much remains to be done in educating those engaged in food production and distribution. A good gauge of the practice of food hygiene is the true incidence of food-poisoning. Field workers constantly uncover outbreaks which the general practitioner either does not hear about or, if he does, fails to report to the authorities. Apart from the occasional deaths, these preventable illnesses cause much suffering and loss of time. For this reason Mr. Dewberry's general review of food-poisoning should be of wide interest. As he points out, food-poisoning can be caused by metals, poisonous plants, fungi, and fish, besides bacteria. Lead, arsenic, and especially zinc poisoning, which is usually caused by cooking acid fruits in galvanised containers, still occur, though less commonly. The fallacy persists that tinned foods are specially dangerous, either from the metal or from their bacterial content, though all recent evidence points the other way. At the time of year when wild mushrooms are in season, *Amanita phalloides*, with its incubation period of 6–18 hours, as well as the various species which produce a muscarine effect after a shorter time, lies in wait for the unwary gatherer. Enteric fever from eating contaminated shellfish is not as rare as it should be, but there are few cases of severe fish-poisoning in this country. Mussels have killed several people in California, and outbreaks are reported from both sides of the Atlantic. Typical cases of poisoning by the well-known poisonous plants containing alkaloids, such as coniine and hyoscyamine, are briefly described.

Bacterial food-poisoning is evidently increasing. New tools, particularly the phage-typing technique, enable us to establish the cause and to trace the source of outbreaks which in the past would have remained unknown. Poisoning by staphylococcal enterotoxin is so common and the symptoms so characteristic that the practitioner should seldom miss the opportunity to have outbreaks investigated. As Dewberry points out, much has still to be learnt about the nature and mode of action of enterotoxin but a great deal can be done to eliminate its consequences. Despite our wealth of bacteriological information about the salmonella group of organisms, present methods of controlling this type of food infection are obviously inadequate. On the other hand, only a few family outbreaks of botulism have occurred since the Loch Maree tragedy in 1922; but as long as bottling remains a national duty some householders may rashly bottle vegetables—which are more likely than fruits to contain spores of *Cl. botulinum*—and so run the risk of botulism. Dewberry describes all of these food hazards in a manner which will perhaps interest the general reader more than the expert; but his aim is to spread information about food-poisoning, and so to reduce it.

Freud: Master and Friend

HANNS SACHS. London: Imago Publishing Co. 1946. Pp. 192. 9*s.*

THE personality of a man who threw such light on personality and its origins as Freud did has unusual interest. Hanns Sachs was on intimate terms with him for nearly thirty-five years and here presents a moving and attractive picture of the man who, he says, was "the great event and adventure of my life." Singlemindedness, tenacity, courage, intellectual honesty, and vigour were outstanding traits in Freud which partly explain the originality and fruitfulness of his thought: his relationship with his family and his friends bespeaks complete integrity and constancy; and Dr. Sachs, through a bare recital of the ways in which he saw these qualities exhibited, succeeds in conveying to the reader his own conviction that Freud was a "great man of the sort that is not born in every century." Until Anna Freud has written the biography of her father which Dr. Sachs desiderates in his introduction, this little book is likely to remain the most intimate personal account we have of an austerely devoted revolutionary genius of our time.

Trend of National Intelligence (London: Eugenics Society and Hamish Hamilton. 1947. Pp. 35. 2*s.*).—The first part of this booklet contains Prof. Godfrey Thomson's Galton lecture for 1946, in which he pointed to the inverse relation between size of family and intellectuality. The second part reports a symposium in which was emphasised the need for more precise analysis of slow trends. The lecture and symposium together throw light on a disquieting question.

Physical Treatment of Injuries of the Brain (London: Baillière. 1947. Pp. 96. 10*s.* 6*d.*).—Miss K. M. Hern was in charge of the physiotherapy department at the Military Hospital for Head Injuries at Oxford throughout the war, and in this book she explains the methods which she found most useful in the treatment of residual paralysis and ataxia following cerebral and spinal injuries. She emphasises the cardinal principle that electricity and passive movements are of little value in these cases and that the patient must be taught to make the best use of what neural function remains. The exercises are clearly described and illustrated and the great importance of rhythm in re-education of movement is emphasised. The book is of considerable interest to neurologists and neurosurgeons and should be invaluable to physiotherapists and medical officers in charge of reablement departments.

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THE LANCET

LONDON: SATURDAY, NOV. 1, 1947

Cholera in Egypt

ON Monday, Sept. 22, the medical officer of health at El Korein, an isolated village east of the Nile delta and some 60 km. west of the Suez Canal, reported the admission to Fakous district hospital of five patients with severe intestinal symptoms. Thus started an epidemic which in the first month involved 8308 known cases, with 3230 deaths. A statement by NAZIF Bey to the World Health Organisation's expert committee on quarantine suggests that from the first the Egyptian authorities were alert to the peril. On the Monday evening government officials visited El Korein and established that the disease was cholera; and next day a house-to-house search was made, all sick and suspected cases being sent to an isolation camp. Almost immediately, however, further cases were reported from both banks of the Ismailia Canal; and, although each infected area was cordoned off, infection continued to spread. Its prevalence is still greatest in the area north-east of Cairo where it originated; Upper Egypt escaped infection until the beginning of last week, and Cairo and Alexandria are still almost untouched.

The predominance of the outbreak in rural areas is possibly due to the primitive nature of village water-supplies. During cholera epidemics cases occasionally arise by contact or fly-borne infection, but the disease is usually spread through water. Against such infection man has a natural protection in the acid of his gastric juice, which is capable of killing the ingested organisms; but when large draughts of water are swallowed, especially on an empty stomach, the fluid may pass with unaltered pH into the intestine. The rôle of infected water was shown very clearly in the Hamburg epidemic of 1892. In the city itself the death-rate from cholera was 13·4 per 1000, while in the contiguous suburb of Altona the rate was only 2·1 per 1000. Both city and suburb obtained their water from the Elbe below Hamburg; but Altona, unlike Hamburg, had an efficient filtration plant. The menace of deficient sanitation can be met only by educating the public to boil water and avoid contaminated food; and unhappily at least a section of Egypt's population is unlikely to coöperate in such measures. There have been accounts of ritualistic cutting of the air to ward off infection [1]; 27 people fell ill after drinking from a well down which the body of a boy had been cast; hidden under vegetables in a cart entering Cairo were two corpses of cholera victims.[2]

Cholera prospers in the region of deltas; and in the Nile delta, with its network of interlacing canals supplied from the one great river, lies the threat of a lengthy outbreak. Here, however, history offers some comfort, for cholera has never yet obtained a permanent foothold in any country to the west of India; each epidemic has been traceable to its origin in the East, from which the organism has been conveyed by man. The route of infection in the present outbreak is still uncertain. There is no indication of an overland spread such as that which occurred more than once in the nineteenth century, when cholera reached Europe via Afghanistan, Persia, and south-east Russia. Egypt has commonly become infected by men and women returning from religious pilgrimages; but this year the epidemic began before the start of the pilgrimage season. The proximity of El Korein to the canal zone brings to mind the possibility of infection having been introduced by sea. The European epidemics of 1863–69 and of 1879–83 first reached Egypt via Bombay, Aden, and Mecca; and it was in Egypt in 1883 that ROBERT KOCH identified the cholera vibrio. A correspondent [3] has suggested that troop movements from India may have accounted for the outbreak. This to say the least is improbable, since troops are under continuous supervision and no cases have yet been reported among British military personnel. There remain, however, the possibilities of an undetected case in a ship trading with the East, and of infection having been carried by aircraft; Egypt, and for that matter England, can be reached by air within the incubation period of the disease. Cholera is one of the five infections against which the international conventions for sea and air travel are particularly directed, and the troubled state of some parts of the world should prompt redoubled attention to their observance. Whether the epidemic is now to spread round or across the Mediterranean into Europe depends on the efficacy of the measures taken by each country at its frontiers. Fortunately, efficient quarantine is an almost perfect bar to the entry of infection. Moreover, there has been no instance of a chronic cholera carrier producing groups of cases at intervals remote in time and place from his original infection, and it is now doubted by many whether an effective healthy carrier-state exists; in areas of Bengal where the disease is prevalent the vibrio, in the course of an extensive investigation, has been isolated only in close association with actual cases of cholera. Recent work suggests that earlier reports of protracted excretion of the vibrio may have been vitiated by fallacies in serological diagnosis; furthermore, isolation of the organism at intervals from the stools of cholera convalescents and contacts may result from successive reinfections without clinical symptoms. There is reliable evidence that in most cases of cholera the vibrio is not excreted beyond the fifth day although sometimes excretion continues up to two weeks or slightly longer.

Since 1902, it is said, only 5 cases of cholera, all in 1918, have been seen in Egypt [4]; and a fuller understanding of the epidemiology may emerge from observations in a country long untouched by serious outbreaks. In India Sir LEONARD ROGERS [5] had remarkable success in forecasting outbreaks, which, he said, are likely to start when the absolute humidity

1. *Times*, Oct. 20.
2. British United Press.
3. Rida, A. *Lancet*, Oct. 25, p. 636.
4. *Brux-méd.* 1947, **27**, 2312.
5. Rogers, L., in British Encyclopædia of Medical Practice, London, 1937, vol. 3, p. 166.

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of the atmosphere exceeds 0·4 ; and it will be interesting to see whether his conclusions are confirmed in Egypt. The most heavily infected provinces are being divided into several separate sections, each under the charge of a doctor with sweeping powers. The authorities are also attempting to get each member of the population inoculated with anti-cholera vaccine. It is generally agreed that active immunisation, if repeated from time to time, is more or less effective ; and it may be hoped that this impression will soon receive statistical backing when the results of a large-scale inoculation study in India are obtained. But immunisation, however effective for personal prophylaxis, will never eradicate cholera. The world can be freed of this scourge only by attack at its two sources—Lower Bengal and the Yangtse valley. The World Health Organisation, when it gets into its stride, might well set about this task through a programme of sanitation and education in these two areas. There could be no better proof of its value to mankind.

Clinical Tropical Medicine in London

Sir PHILIP MANSON-BAHR's informative and witty presidential address on Oct. 16 to the Royal Society of Tropical Medicine and Hygiene ended with a nostalgic picture of the old Endsleigh Gardens Hospital for Tropical Diseases, in which so much of his work has been done. At this point some of his hearers must have been moved to reflect on the many vicissitudes of clinical tropical medicine in London.

Great Britain has had colonies and settlements in the tropics for nearly three hundred years, but there was no institution in this country for the systematic teaching of tropical medicine and hygiene until less than fifty years ago. Towards the end of last century Sir ALFRED JONES, leader of a group of West African merchants, formulated a scheme which ultimately led to the foundation of the Liverpool School of Tropical Medicine ; and about the same time, in London, Sir PATRICK MANSON put before the secretary of the Seamen's Hospital Society the idea of using the Albert Dock Hospital for teaching tropical medicine. JOSEPH CHAMBERLAIN, then Colonial Secretary, gave his warm support to the scheme evolved at the Albert Dock, and on Oct. 3, 1899, the first teaching session there began with 27 students. Both in Liverpool and in London the clinical schools in tropical medicine started in general hospitals in the dock areas, but as they developed they moved nearer to the city and university centres. In 1920 the growing London school was transferred from the Albert Dock Hospital to a separate Hospital for Tropical Diseases established in Endsleigh Gardens. Conveniently and centrally situated, close to the academic centre in which the combined London School of Hygiene and Tropical Medicine was soon to arise, the work of this hospital rapidly expanded, and it stood as a vital monument to the spirit and foresight of MANSON. But the late war struck two severe blows at its very heart : first, because of the threat of bombing, it had to be completely removed to various other hospitals—which destroyed its clinical unity—and secondly most of its staff were scattered on service throughout the world. Those interested soon saw that unless this process of disintegration could be reversed London would be unable after the war to resume the contribution to treatment, teaching, and research in tropical medicine that it had worthily made since the beginning of the century.

Early in 1945 a meeting composed of representatives of Government departments, Dominion and Colonial interests, the Services, learned societies, and academic, hospital, and other bodies concerned met and made recommendations. It was agreed on the highest level that a suitable hospital of some 200–300 beds should be established, near and linked to the academic teaching school and research laboratories and forming a closely knit tropical centre. Thus the teaching of tropical medicine would be centralised, with close association between the clinicians and those working in the related academic sciences, while the concentration of patients suffering from tropical diseases would not only increase the scope and value of clinical teaching but would also provide material for detailed or large-scale research. In addition, such a centre would attract postgraduates from all countries and form one of the focal points of tropical medicine. Harmonious coöperation with the other great British centre at Liverpool was envisaged, while liaison with various research laboratories in different parts of the tropics would enable workers to be interchanged. Pending realisation of these plans, an attempt was made to fill the gap left by the closure of the old hospital by acquiring a nursing-home at 23, Devonshire Street, W.1, and using it as a temporary hospital. Unfortunately, admirable though this temporary hospital has proved from the standpoint of its individual patients, it has not room for all the appropriate cases, many of which have to be sent to other hospitals within the Seamen's Hospital Society and elsewhere. Moreover, it does not possess the space and facilities required for teaching large classes of students nor for research laboratories worthy of the clinical material on hand. Notwithstanding these difficulties, large classes of medical and nursing students are receiving instruction in tropical diseases ; but the waste and trouble caused by the present dispersion of patients is considerable, and the need for the formation of a single centre is great.

Unhappily, hope for the major scheme now burns less bright. Controls, and the need for reducing capital expenditure, seem to make the possibility of building remote, while uncertainty about the exact pattern of our future health service and economic status possibly has a restraining influence on planning and development. Nevertheless there are cogent reasons for pressing on without further delays. Though tropical disease must be studied in the tropics, it must also be studied, against an academic background, in major scientific centres, of which London is outstandingly suited to the purpose. Today the greater movement of peoples and the rapidity of modern transport are bringing about a virtual contraction of the world that is bound to increase the interest taken in tropical diseases and necessitate further study and instruction in tropical medicine. Likewise the development of new agricultural and commercial undertakings in the Colonies, whose importance for the welfare of Colonial peoples and for the very survival of our Commonwealth needs little emphasis, and the obligations that we

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owe to the Colonial peoples, make the restoration of every facility for treatment, research, and teaching in tropical medicine a matter of true urgency. Like Sir PHILIP MANSON-BAHR, we trust therefore that some way will be found to enable the principal city of the Commonwealth to resume its proper part in advancing and disseminating knowledge of clinical tropical medicine.

Present Status of Disc Surgery

IN 1934 MIXTER and BARR [1] reported a series of 19 patients operated on for prolapse of a lumbar intervertebral disc. If their observations were not novel, at any rate they marked the beginning of an epoch. Many thousands of operations for disc anomalies have been performed during the last decade by general surgeons, neurosurgeons, and orthopædic surgeons the world over; and, as long-term results accumulate and large series are recorded, it is possible to put this work in its right perspective. Yet the subject is still young enough for surgeons to disagree widely and often dogmatically on points which seem fundamental—such as the precise indications for operation; whether one should be as ready to operate for low back pain as for sciatica; the best surgical exposure; the living pathological appearances of the exposed disc, and how much of it should be removed; and, not least, the desirability of spinal fusion. These and other matters are dealt with by MURRAY FALCONER in his Hunterian lecture summarised in this issue, and were discussed at the annual meeting of the American Orthopedic Association last year.[2]

The difference between personal approaches is notable. That enthusiast and individualist, the late WALTER DANDY, performed 843 operations in four years, using a peephole interlaminar approach by removing the ligamentum flavum on one side only.[3] He tried to remove the whole disc and believed that raw vertebral surfaces left to approximate might fuse spontaneously. He described the "concealed disc" as a common and important lesion; he regarded myelography as unnecessary and unhelpful, and never carried out deliberate spinal fusion. On the other hand, FALCONER, another neurosurgeon, often uses myelography and favours routine wide laminectomy. He agrees on the common finding of an "intermittent prolapse" equivalent to DANDY's concealed disc—one which is not obviously abnormal but is soft to the touch and may be made to bulge by extending the spine. He does a very radical curettage from both sides of the theca and is also entirely opposed to fusion. In this country BURNS and YOUNG [4] have taken the increasingly accepted views that most cases of low back pain and sciatica, together or separate, are the result of a prolapsed disc; that myelography is often useless and deceptive or actually harmful, so it should be done only when a rarity like a cauda equina tumour is suspected; that the neurological picture is of no help in localisation; and that many cases will be missed unless the routine procedure is a wide laminectomy with inspection of both 4th and 5th discs.

1. Mixter, W. J., Barr, J. S. *New Engl. J. Med.* 1934, **211**, 210.
2. *J. Bone Jt Surg.* 1947, **29**, 424 et seq.
3. Lenhard, R. E. *Ibid*, p. 425.
4. Burns, B. H., Young, R. H. *Lancet*, 1945, ii, 424; 1947, i, 623.

The question of spinal fusion, on which BURNS and YOUNG seem to have said nothing as yet, urgently needs clarification. The extensive laminectomy required for an adequate operation is bound to weaken the back. Moreover, the chronic derangement of an intervertebral joint which precedes the operation, even if it is not exacerbated by removal of the disc, may be enough to cause persistent low back trouble in the unfused spine during the years that follow. In some cases fusion must be called for, but the selection of these cases needs much care. One reason for neglecting fusion is given by BARR,[5] who remarks that "certain neurosurgeons . . . have been so impressed by the obvious relief of the patient's acute sciatica that they have failed to look carefully for late evidence of a mechanically unsound back"; this comment applies to all who are concerned merely with the short-term relief of the disabling symptom. BARR thinks that as technique improves a spinal fusion will be done in every patient at the time of laminectomy, and STEINDLER [6] is in general agreement with this view, because there is a significant rise in the percentage of cases permanently relieved of back symptoms when fusion has been performed. LOVE,[7] another of the pioneers in this field, would restrict the indications for fusion to cases with definite evidence of lumbosacral instability. An unspoken objection to fusion which must weigh heavily with the surgeon is that the standard orthopædic procedure requires three months in a plaster bed and protracted support and reablement thereafter. The laminectomy alone is such a common operation nowadays that there is a natural temptation to save hospital beds by declaring that fusion is unnecessary—it would, indeed, be impracticable. As was said in these columns two years ago,[8] what is needed is a revolutionary method of securing rapid stable fusion, and the Bosworth clothes-peg graft was then put forward as such a method. FALCONER gave up having alternate cases grafted by his orthopædic colleagues because the grafts often failed to fuse to the spine, and it may well be that the standard orthopædic procedure is not only a long job but is not a fusion. Merely to slip a cortical graft on either side of the spinous processes without the most careful preparation of the bed will not suffice, and apparent success may be due only to fibrous scarring in the soft tissues of the low back. BARR and STEINDLER both recommend the Bosworth operation, which gives rigid fixation of the spine with no more than the usual three or four weeks in bed, and without the need for a plaster jacket or other support. This H-shaped graft, cut from ilium or tibia, is wedged tightly between the 4th lumbar and 1st sacral spines while they are held apart in acute flexion, so it is firmly locked in place when the spine is again extended.[9] There seems to be every reason for running properly controlled series in the larger orthopædic and neurosurgical centres, doing fusion in this or a similar way in alternate cases. Then, in five or ten years' time, we shall know whether fusion is necessary or not.

5. Barr, J. S. *J. Bone Jt Surg.* 1947, **29**, 429.
6. Steindler, A. *Ibid*, p. 455.
7. Love, J. G. *Ibid*, p. 438.
8. *Lancet*, 1945, ii, 436.
9. Bosworth, D. M. *Surg. Gynec. Obstet.* 1942, **75**, 593; *Amer. J. Surg.* 1945, **67**, 61.

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Annotations

THE NEW FOOD CUTS

A WEEK ago Sir Stafford Cripps, in outlining the measures projected by the Government to save dollars, announced a further reduction in our expenditure on foods imported from dollar countries. The only rationed foods immediately affected by this reduction are sugar and eggs. The weekly sugar ration, which was raised from 8 oz. to 10 oz. a month ago, reverts to 8 oz., and there is to be a saving on imports of Canadian eggs, which will severely restrict the supplies to bakers, though the allocation of shell eggs to the public in the coming year is expected to be 66 per head compared with 58 last year. Meat remains at 1*s.* and bacon at 1 oz. a week. Sir Stafford Cripps promised that every effort would be made to offset the reductions by increased imports from soft-currency countries. But if these attempts fail the effect would be to reduce the average calorie intake per head of the population from its present level of about 2870 a day to 2700.

This is a significant fall, and it was not clear from Sir Stafford's speech how it will come about. Presumably his calculations include among the " other changes brought about for quite other reasons " the likely reduction in potato supplies consequent on the poor harvest. The average of 2700 remains above the requirement level estimated in the recent Ministry of Food white-paper,[1] which was 2550; but the reduction will bring us uncomfortably near to that basic level, and there will be an increasing danger that where distribution is faulty some will not get enough to maintain their health and efficiency. This is particularly likely in the " family pool," where the mother is apt to deny herself for the sake of the wage-earners and children, and cannot compensate for this by getting food at a restaurant or canteen.

COMPATIBILITY OF ANTIBIOTICS AND STYPTICS

THE compatibility or otherwise of the antibiotics and the styptics—two groups of substances often used simultaneously in surgery—is clearly of practical importance. One would have expected to see the subject thoroughly investigated as part of the routine study of the new styptics before their release for general use. Yet, judging from the published work, the investigations seem even now to be incomplete.

Fleming and Fish [2] have studied the effect of locally applied sodium penicillin on the coagulation of blood. They find in oral surgery that sodium penicillin powder interferes both with clot-formation and with the maintenance of the firmness of a previously formed clot. Their results were much the same with commercial sodium penicillin and with the lately developed pure crystalline salt. Blockley,[3] on the other hand, reports that calcium penicillin in combination with sodium alginate, in powder form, locally applied in the same type of case, is a rapid and satisfactory styptic which also exhibits the known action of penicillin. Correll and Wise [4] have investigated the stability of penicillin, streptomycin, and thrombin in the presence of two styptics developed in the United States—gelatin sponge and oxidised cellulose. They find that oxidised cellulose (' Oxycel ') rapidly destroys thrombin and penicillin, whereas streptomycin is unaffected by it. Gelatin sponge has no deleterious effect on either penicillin or streptomycin. The penicillin which was used in their experiments was the calcium salt. Their observation on the destruction of thrombin activity by oxycellulose corroborates the earlier findings of Seegers and Doub,[5] and they agree with these workers that the destructive effect of oxidised cellulose is due to its acid reaction, which can be corrected with sodium bicarbonate. This may explain why other workers find that oxidised cellulose and penicillin are compatible.

It is not easy to link up even the few investigations that have been made on these lines. Some workers have used only sodium penicillin and others only calcium penicillin, and different methods of assay have been adopted. There is clearly a need for exact studies of these compatibilities which will tell the surgeon conclusively whether he can use the various substances together. It might further be of interest to find out how the activity of antibiotics and styptics is affected by the various changes in pH level taking place in extravasated blood, clot, and tissues during healing under various conditions met with in practice (e.g., in the presence or absence of infection); and to decide the optimum pH for the different substances. More information on the hæmostatic or anticoagulant mechanisms involved would also be welcome.

MODERN EDUCATION OF THE DEAF

DEAFNESS and partial deafness are among the defects which can be mastered. Children born deaf or becoming deaf early in life often make a poor start in learning to overcome their disability, either because it is not noticed in good time—a child with high-tone deafness is often thought to hear normally by his parents and friends—or because their parents think there is no way of helping them until they reach school age. In these columns last week, Mr. A. W. G. Ewing, PH.D., and Mrs. Irene Ewing, M.SC., outlined the principles of home training adopted experimentally for such children referred to the research unit at Manchester University. The theme is developed more fully in their book, *Opportunity and the Deaf Child*.[6] This training is an exercise in imagination for the parents. The mother especially must learn to think in terms of the child's experience as compared with that of the normal child, and to supplement it deliberately. The Ewings have found that, given suitable opportunities, some children begin learning to lip-read when they are even as young as eighteen months; and some are trying to say words when they are still under two years. To do this they must have plenty of chances to see the mother speaking.

The mother begins with routine requests which call for the child's coöperation; thus at bath-time she always says " Give me the soap," " Bring me the towel," " Stand up," and other appropriate things, until he is doing them quickly in whatever order they are spoken. Then she begins to speak familiar words in new situations: she tells him to " stand up " at times other than bath-time, or gets him to fetch the soap when she is washing up. The next stage is the learning of new words, and this depends on the interest she has roused in the child; he begins to point at objects and to watch for their names on his mother's lips. All deaf children babble at first, and they must be encouraged to use their voices, for if they once fall silent it is difficult to get them to start speaking. The mother should always look pleased when the child makes sounds, and especially when he tries to speak words, though she should not attempt, the Ewings think, to teach him to say the words properly—that is a job for a trained teacher of the deaf. The deaf child's chances of seeing speech cannot compare in number with the normal child's chances of hearing it, because the normal child hears speech going on around him even when his eyes and hands are engaged on something else, whereas the deaf child must interrupt his pursuits to watch his mother's face. His progress thus largely depends on her ingenuity in creating oppor-

1. See *Lancet*, Sept. 13, p. 407.
2. Fleming, A., Fish, E. W. *Brit. med. J.* 1947, ii, 242.
3. Blockley, C. H. *Brit. dent. J.* 1947, 82, 213.
4. Correll, J. L., Wise, E. C. *Surg. Gynec. Obstet.* 1947, 85, 211.
5. Seegers, W. H., Doub, L. *Proc. Soc. exp. Biol., N.Y.* 1944, 56, 72.
6. University of London Press. Pp. 252. 9*s.* 6*d.*

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tunities for him to see her speaking, her perseverance, and her ability to secure his interest. His early years of learning are thus very much a joint affair.

To learn to speak is much more of an undertaking than to learn to lip-read; and many deaf people who lip-read easily enough place their friends at a disadvantage by speaking barely intelligibly. Their relative failure is due in part to the soft monotony of their tone; and a new equipment devised by the Bell Telephone Laboratories in America, and described in a new book,[7] may help advanced deaf students to overcome this difficulty. By means of a cathode-ray translator, luminous patterns of speech are thrown on a screen and move across it at a rate which allows them to be identified. The patterns are striking, divergent, and reasonably easily learned. They are phonetic symbols: thus the words "one" and "won" produce the same pattern, and another pattern gives "two," "to," and "too." Speech can readily be read off by anyone who has learned the patterns. By speaking back what he has read, the deaf student should be able to compare his own pronunciation with that of the model, and so correct it. Moreover, the instrument gives some indications of pitch, and if these can be developed more fully they should help the deaf person to modulate his voice according to normal tones and inflections. The device is clearly only suitable for advanced training at present, and in any case is still in the experimental stage; but it offers promise for the future.

THE EPIDEMIOLOGIST AND CHRONIC DISEASE

LAST spring, at a conference held by the New York Academy of Medicine, Dr. J. W. Mountin, of the U.S. Public Health Service, chided epidemiologists for their preoccupation with acute infectious disease—their "Broad Street Pump fixation"—and appealed for greater attention to the chronic disorders. Prof. A. D. Langmuir, of Johns Hopkins, returned to this criticism at the recently concluded meeting of the American Public Health Association, and discussed the reasons why progress has been slow. The epidemiologist, he said, is concerned with all people in defined universes, both the sick and the well, in relation to each other and to their environment. In all types of disease the epidemiologist wishes to count cases accurately, both manifest illness and inapparent disease; he needs to follow the dynamic flow of these cases through his population; he wishes to determine the many selective factors, such as age, sex, genetic background, susceptibility, immunity, and environment, that may influence this dynamic process. In acute epidemic disease simple incidence and mortality rates may be a sufficient basis for such investigations and results may often be quickly obtained. In the chronic diseases, though the essential principles of study remain the same, the time-factor conditions and complicates every method of inquiry. The determination of incidence-rates may be extremely difficult because the circumstances of onset are often obscure. Discovery rates and prevalence ratios must often be substituted. Person-years analyses and modified life-table procedures may need to be employed. Long-term follow-up is necessary. And the problem of the index case is always present to plague the investigator.

Professor Langmuir illustrated these difficulties by a consideration of rheumatic fever, a typical chronic disease, where, despite innumerable inquiries, little in the epidemiology—or ætiology—is well enough established to find general acceptance. The opportunities for study nevertheless exist in the epidemics which arise from time to time in military camps, in food-borne epidemics of septic sore throat, and in institutional outbreaks of streptococcal infection. The rheumatism schemes (much influenced by the example of the London County Council and now, if slowly, being developed in America) should also promote much-needed epidemiological investigation. Rheumatism registers, accurately kept and up to date, recording all cases occurring and recurring through the years and related to a defined and measurable population at risk, can, for the first time, provide the material needed for examining the spread of rheumatic fever through a community. Such morbidity statistics are incomparably more effective tools for the epidemiologist than hospital and clinic data derived from an unknown and biased population sample, or the results of static surveys of small sections of a population, or studies confined to rheumatic families.

Not content with this extension of the field of epidemiology, Professor Dublin, of Long Island, pleaded for the application of epidemiological principles to rheumatism schemes as well as to rheumatism—to the explanation why, with the need so demonstrable, some communities have comprehensive programmes and many do not.

7. Visible Speech. New York: D. Van Nostrand. London agents: Macmillan. 1947. Pp. 441. 25s.

SEXUAL ABNORMALITY AND THE LAW

THE great bulk of sexual aberrations do not concern the law; but those which do—notably exhibitionism and homosexuality—arouse in many people, doctors and lawyers not excluded, so much conscious and unconscious prejudice that the subject is not approached with proper detachment. In an address originally given to the Medico-Legal Society last year, Dr. Edward Glover[1] argues that abnormal sexual conduct needs suitable psychological observation and treatment, and that no other form of treatment has the slightest chance of doing good. Most of us will agree with him; but we have to recognise that the law is concerned with the well-being of society rather than that of the individual. Dr. Glover admits the difficulties of legislating for the kind of sexual offences which include, for example, assault on unknown persons: unless the offenders can be rapidly cured, society must be protected by their segregation, even though they might be treated more successfully at home or at a clinic. But he urges that every sexual offender without exception should be psychologically examined and given the opportunity of receiving psychological treatment; and that preferably both examination and treatment should be carried out by medical psychologists who are not officially connected with the court. Whenever possible the patient should be allowed to live at home, whether on probation or not, and encouraged to follow his usual work. If in the public interest it is necessary to segregate him, he should be put into an institution where he can have expert psychological aid—e.g., in an inpatient psychiatric centre. Even in favourable cases, suitable for treatment at home, immediate recovery cannot be expected; it is in the nature of compulsions that even under treatment they are liable to be repeated. The courts, Dr. Glover thinks, too readily assume that because an offence is repeated "the case is to be written off as a failure suitable only for condign measures of punishment." Good results are to be hoped from placing the patient in a county foster-home within easy reach of a psychiatric centre; and an ascending scale of supervision could be drawn up, from probationary control up to temporary segregation.

There is much to be said, in Dr. Glover's opinion, for reforming the present system of charging sexual offenders: they could more suitably be charged with offences against public decency, and bound over on set terms for treatment and supervision. Subsequent offences would then constitute contempt of court, the penalties for which would be suspended until all efforts at treatment had failed.

1. Social and Legal Aspects of Sexual Abnormality. Reprinted as a brochure by the Institute for the Scientific Treatment of Delinquency, 8, Bourdon Street, Davies Street, London, W.1. Pp. 16. 1s.

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ECONOMICS OF PUBLIC HEALTH

A PLEA for priority for public-health services—especially those that maintain and raise physical and mental fitness—was made by Dr. F. Hall, M.O.H. for Lancashire, in his presidential address on Oct. 23 to the Society of Medical Officers of Health. He quoted with approval the remark of the Working Party on Nursing that we must "ascertain the optimal effort that needs to be devoted to preventive and curative services respectively." The passing of the National Health Service Act, he said, is a recognition of the advances made in all branches of medical science, "and in one sense may be regarded as a compliment to the profession"; but its emphasis, he feels, is on medical treatment rather than on public-health measures. However, he foresees that when the expense of treating sickness in hospitals and other institutions is no longer masked by gifts, either of money or service, but appears publicly in the nation's accounts, the administrator will pay more attention to preventive methods, and there will be more likelihood of these being intensively applied both in the medical field and in home and factory.

Today, said Dr. Hall, there are special reasons why we should develop means of improving the health of the people, and their productive capacity. But even when our immediate economic difficulties have been overcome there will still be problems, arising from the effects of two wars and the ageing of the population, which it will be hard to solve unless the public health is raised to a far higher level than now obtains. While not wishing to underestimate the importance of providing for members of the community who become unfit by reason of age or infirmity, he urged that their care and welfare "depend in the long run upon the soundness of the national economy, to which a high standard of public health makes the most valuable contribution." Of the measures proved useful for preventing ill health some can be carried out by central authorities, but the majority demand local investigation and personal contacts.

The appointment of the first medical officer of health a hundred years ago was, in Dr. Hall's view, a business proposition; and he clearly believes that it is through Duncan's successors that medicine could make its greatest contribution to the nation's economic well-being.

THE NOBEL PRIZEMEN

THE Nobel prize for medicine for 1947 is shared between Prof. Bernardo A. Houssay, of Buenos Aires, and Prof. Carl F. Cori and Dr. Gerty T. Cori, of the department of biochemistry, Washington University, St. Louis.

The value of Professor Houssay's work is recognised by all interested in the problems of the endocrine control of metabolism in general and of carbohydrate metabolism in particular. It is now over twenty years since he first demonstrated the importance of the pituitary gland in carbohydrate metabolism, and his observation that removal of the anterior portion of that gland reduces the severity of experimental diabetes mellitus was responsible for a rapid advance in our knowledge of the metabolic defect in diabetes. Before Houssay's experiments it was widely accepted that the fully depancreatised dog could combust no carbohydrate at all, since it was believed that insulin was essential for any oxidation of carbohydrate. Houssay's experiments demonstrated in a straightforward manner that carbohydrate oxidation can take place in the animal body, in the apparently complete absence of insulin. Furthermore, his demonstration that the hypophysectomised-depancreatised dog (the "Houssay" animal) can survive much longer than the dog from which the pancreas alone has been removed, revealed an antagonism between the effects of anterior-pituitary extract and of insulin. Subsequently he and his school, and also other investigators, were able to induce a temporarily diabetic condition in animals treated with anterior-pituitary extract, and this has again led to fundamental advances.

Dr. and Mrs. Cori have worked for many years in a field which has now merged to some extent with that studied from a different angle by Houssay and his school. Since the early 1920's the Coris have pursued the glucose molecule in its peregrinations round the animal body, into glycogen, into lactic acid, into hexose phosphates, and into many other intermediary compounds. Their demonstration of the in-vitro synthesis of glycogen and of starch from glucose-1-phosphate by appropriate enzyme systems was a most useful contribution in this field, and more recently they have shown the antagonistic influences of anterior-pituitary extract and insulin in the formation of the glucose-6-phosphate from glucose in vitro under the action of the enzyme hexokinase. This demonstration has gone a long way towards providing the explanation in terms of enzyme systems of the observations of Houssay and others on the antagonistic action of anterior-pituitary extracts and of insulin, and has opened a new approach to the action of hormones on enzyme systems in general.

WORLD CONGRESS ON MENTAL HEALTH

THERE have already been two world congresses on mental health: one at Washington in 1930, and the other in Paris in 1937. The third congress, to be held in London next year from Aug. 11 to 21, has been designed on ambitious lines, and will, it is hoped, attract some 3000 people from over fifty countries. The difficulties of reaching this country may be eased by the active support promised by UNESCO and the World Health Organisation.

The congress will embody international conferences on child psychiatry and medical psychotherapy (Aug. 12–15) and on mental hygiene (Aug. 16–21). The themes will be, in the first conference, foundations of mental health in childhood; in the second, guilt; and in the third, mental health and world citizenship. The congress committee, headed by Dr. J. R. Rees, is exerting itself to ensure that the communications on this last topic shall represent all shades of opinion in each country. Sociologists, psychologists, educationists, and others are being invited to participate; and already discussion groups, or preparatory commissions, have been set up in this country and in North America to synthesise different individual views. The work of these commissions is coördinated from London by means of a monthly digest of activity in all countries. The organisers' hope is that international comparisons will lead to a clearer understanding of the social relationships bearing on the well-being of the individual and of society. Information may be had from the congress office at 39, Queen Anne Street, London, W.1.

NEGOTIATIONS WITH THE MINISTER

ANSWERING a question in Parliament last week the Minister of Health explained that he has not yet met the Negotiating Committee but intends to do so soon. Arrangements for the National Health Service have been discussed with officers of the Ministry; but the committee will now present a statement to the Minister himself. A meeting with Mr. Bevan has been arranged for the week after next, and it is expected that the committee's statement and the Minister's reply will be published shortly afterwards.

THE death is announced on Oct. 24 of Lieutenant-General Sir HAROLD FAWCUS, director-general of Army Medical Services from 1929 to 1934, and director-general of the British Red Cross Society from 1934 to 1938. He was 71 years of age.

THE next session of the General Medical Council will be held on Tuesday, Nov. 25, at 2 P.M., when Sir Herbert Eason, the president, will take the chair.

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Special Articles

APPLIED PHOTOGRAPHY

RELATION OF THE PHOTOGRAPHIC DEPARTMENT TO THE TEACHING HOSPITAL

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LAST year the state of medical photography as it then existed was reviewed (Hansell 1946). Today the position has materially altered and many new departments are arising. In some hospitals the enthusiasm attendant on the establishment of a photographic unit is growing; in others it is declining; in a third group, unfortunately all too small, it is undergoing an evolutionary process consequent on a growing understanding of the real function of such a unit within the parent community. This paper is directed to the first two groups, lest their energies be diverted into channels initially easy but ultimately barren.

The inauguration of a medical photographic department is probably brought about by a realisation of its teaching potentialities. This being so, the future must be safeguarded by ensuring that it is staffed by *experts*. The Institute of British Photographers has devoted a section of its Final Examination to medical photography, so that it should soon be possible to recognise the expert or qualified medical photographer just as it is now possible to recognise the qualified physician or surgeon. It is important, however, to ensure that ultimate control, even though indirect, should not be exercised from a merely technical level, for the potentialities are obviously wider than this.

It is fairly easy to see how false steps may be made. Some of the hospital staff will never use the department; most will probably allow their enthusiasm to outweigh

Fig. 1—Three of a set of six serial records showing the progress of an arteriovenous aneurysm (cavernous sinus).

their judgment, and their requests will too often fall into the "clinical rarity" or the "remarkable recovery" class; yet another group will use the department for the production of purely personal material either for publication or for their private memoirs. To the new department every request brings at least the encouragement of recognition. It is only when unthinking demands are continually made at the expense of valuable record and teaching material that frustration and an automatic technical service appear.

We are concerned here with those functions of a photographic unit within the teaching hospital which seem to us to be of chief importance. Omissions cannot but be numerous. To quote from a letter from the United States:

"At a recent A.M.A. convention . . . the pictures fell into only four of the forty-four medical photographic techniques. . . . If this use can be made of four techniques, there are still plenty of endeavours to encourage along the lines of the other forty."

A fully established medical photographic department has two primary functions: (1) the production of routine record photographs of the highest quality; and (2) the adaptation and application of those records to medical education in its widest sense.

ROUTINE RECORDING

Many processes fall under this heading. First, though not foremost, the rarity. There is a place for this type of record; it is indeed very necessary for the publication of unusual cases, and there will inevitably be places in the curriculum when conditions are mentioned whose rarity involves an absence of clinical material. The indications for this type of record are therefore fairly well defined; they should, however, form only a small proportion of the total.

The mainstay of recorded material will be the normal or usual type of case. Suitable cases should be recorded before, during, and after treatment; for, apart from increasing the available teaching material, the photographs provide a record of progress which can rarely be conveyed with comparable accuracy by the written word. An example of this type is seen in fig. 1.

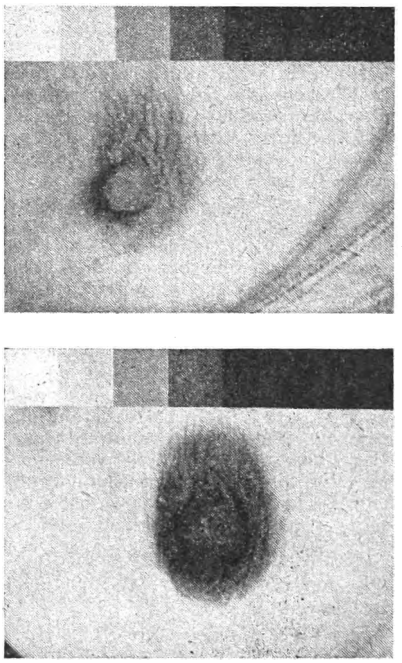

Fig. 2—Œstrogen therapy: pigmentation changes of nipple in six weeks.

True serial photographs form a subdivision of this group. These differ from the records just described in that an attempt is made not only to produce strictly comparable pictures but also to introduce a clinically significant time-interval between each. Whereas the former aims primarily at tangible material for future use, the series now under consideration is of use in the direct assessment of progress and may have an influence on treatment. The following two examples will illustrate this point:

(1) *Œstrogen Therapy.*—Œstrogens are now widely used in the non-operative treatment of malignant disease. It has been noted that a side-effect is progressive pigmentation, especially of the areola.

At the Christie Hospital, Manchester, possible correlation of this effect with tumour response is being investigated. Annotations being unreliable, the areola is now photographed at each attendance, a stepped density wedge being included in the picture area.

Prints are filed with the history, and the negative is measured on a densitometer, a note being made of the step of the wedge corresponding to the image of the areola.

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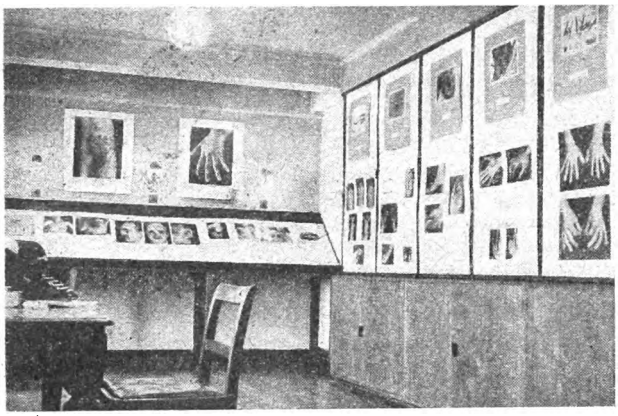

Fig. 3—Static display.

Fig. 2 shows two such records at an interval of six weeks: the change in pigmentation is not only obvious but is also measurable with reasonable accuracy.

(2) *Radium Workers' Survey.*—Accurate assessment of early changes due to radiation is of importance to workers who pack and handle radium and radioactive substances.

Recently a half-yearly survey of such workers was started at Westminster Hospital, for human fallibility has made it almost impossible to describe in words any but fairly obvious changes. The process is essentially slow, and time tends to erase the visual memory.

Scale records of the dorsal and palmar aspects of the fingers are made, attention being paid to the rendering of fine detail. A series of six-monthly records enables the clinician to detect minor atrophic changes.

Written notes are also kept, and it is interesting to note that a few cases were thought to have progressed, when in fact inspection of previous photographs showed that they had not. Workers were not therefore involved in a change of employment through the unreliability of memory and clinical notes.

Other uses for routine recording will doubtless suggest themselves to the reader.

Motion pictures are of the greatest value in assessing the progress of cases in which movement is involved; their appeal is thus mainly to the orthopædic surgeon and the neurologist. Periodic records are spliced together for routine checking while the patient is under treatment, and the resultant condensation of time conveys an impression of progress which cannot be approached either by the most perfect clinical notes or even by still photographs.

FILING

Attention has been drawn elsewhere to the important subject of filing systems; passing reference has been made to the subsequent use of records in teaching, and it follows that filing forms a link between pure recording and education. The strength of this link will be reflected in the second function of the medical photographic department—the production of teaching-aids.

In view of previous publications (Hansell 1946, "Mediphote" 1947) it is not intended to discuss the problem at great length. Files or registers will be needed for cross-reference, but such systems should not become so individual that a change of directorship will involve breakdown. The punch-card system was adopted by the Services because of its speed and flexibility, but it is expensive to install; and, if it is used, the coöperation of the teaching staff should be sought so that initial planning should prove adequate for the future. It has the added advantage that it can embrace all material in satellite systems which are themselves constantly undergoing revision (Donnison 1947).

PHOTOGRAPHY IN MEDICAL EDUCATION

A department capable of recording, and of classifying its records, having been evolved, the question of its rôle in medical education arises. In the following scheme the files of records are considered as raw material, and indications are given for the use of this material with the minimum of additional labour. Successive steps involve an increase in technical processes and therefore in expenditure of time and materials.

Display in teaching has been widely discussed in educational literature, but without much direct reference

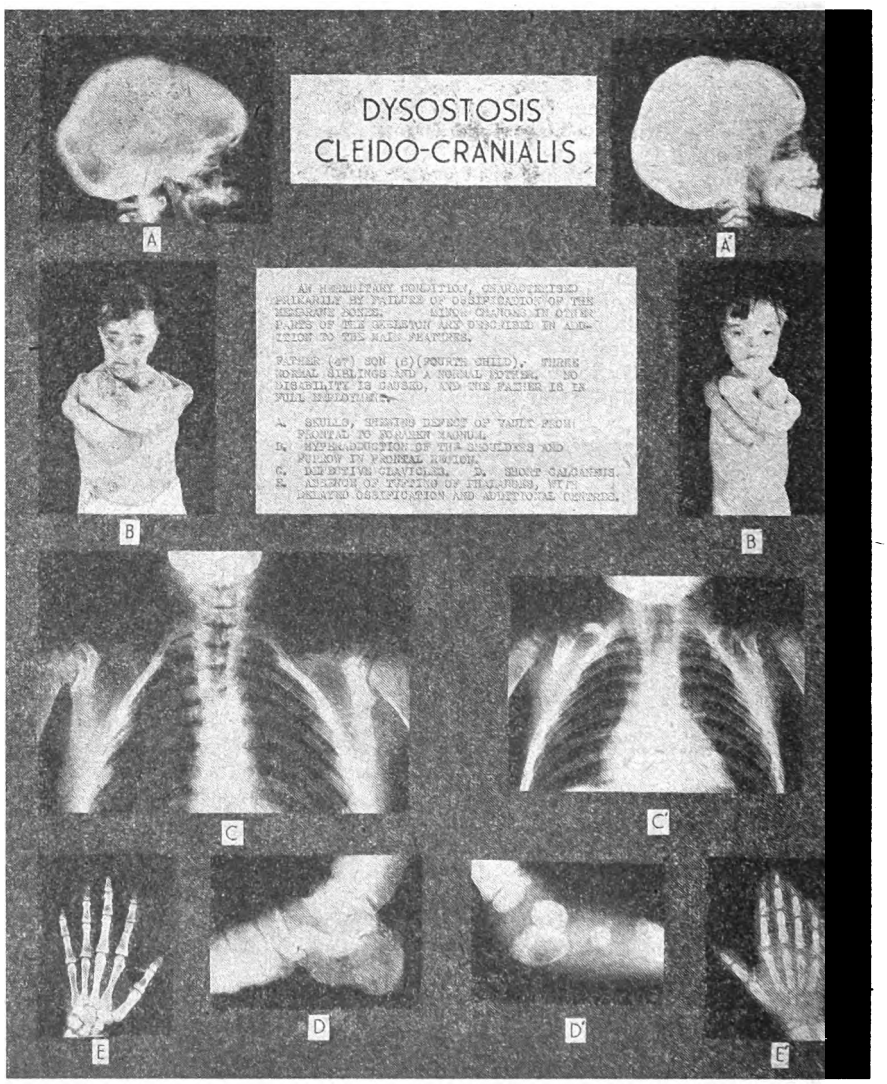

Fig. 4—A typical library card.

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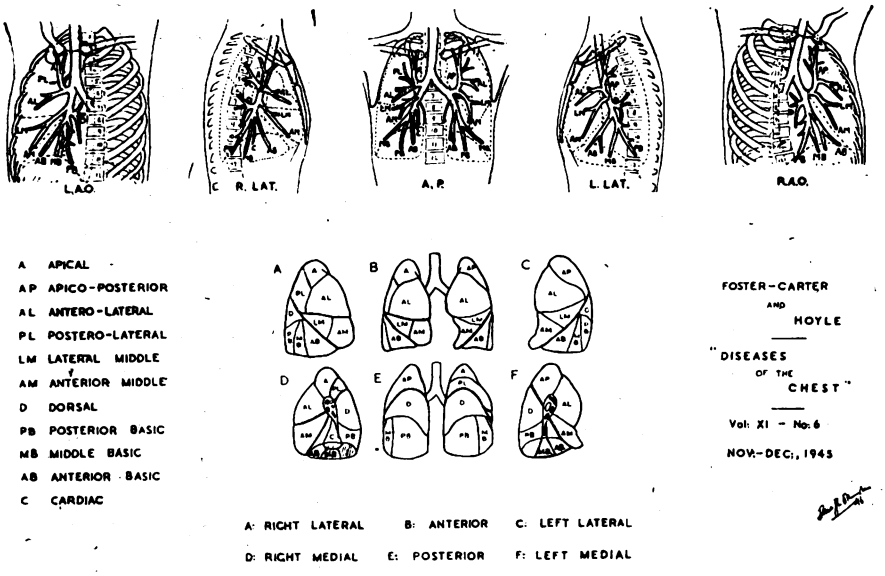

Fig. 5—The segments of the lungs. Mass-produced reflex print for notebook illustration.

to medicine. It is still rare to find good use made of display in medical schools (fig. 3). Only in large institutions, such as the Wellcome Foundation, does the matter seem to have been given much thought; possibly the apparent magnitude of the task has been frightening. Public exhibitions and displays are widely known; yet, although the same principles apply, the teaching communities have lagged. A tradesman exhibiting his wares calculates that a potential customer will pass his stand in a moment, and his display is planned accordingly; even if only one of his large slogans is remembered he is well satisfied. Similarly the essential elements of static medical display are clarity and simplicity. The object is to stimulate the appetite, not to satisfy it.

Library Card.—Closely comparable and often using the same tricks of showmanship, these are displays in miniature. An extensive set of photographs can be mounted on large cards to supplement the necessarily limited illustrations of the textbooks (fig. 4). These may concern themselves with single cases but can well be composite, using photograph, radiogram, micrograph, diagram, and so on. They are placed in the library for the student to study alongside his textbooks.

Notebook Illustrations.—A good department should be able to produce batches of illustrations for issue to students. Prints or reflex copies can be produced simply and cheaply from existing material. Where very many line copies are required the Gestetner "Gestefilm Office Process" has been used with success. Photographic reproduction is especially useful for the illustration which is too elaborate for rapid individual copying, and is likely to show its greatest value in advanced postgraduate teaching (fig. 5).

Lantern Slide.—The $3^1/_4$ in. square transparency is so familiar that it need hardly be mentioned. It has definite disadvantages compared with the miniature 2 in. square slide. Apart from the rapidity and economy with which the latter can be made, their small size and weight and their greater relative strength cannot be ignored. The large slide cannot yet be abandoned for display, since its image is large enough to be examined over an illuminated panel, but mechanised projectors are promised for the small slide; and, when these are readily available, the large type may well disappear.

Filmstrip.—The Royal Society of Medicine recently discussed the use of filmstrip in medical teaching. Other articles (Hansell 1947) have appeared in the journals, and it is unnecessary here to do more than attempt to rectify certain misconceptions. Conservative criticisms are often levelled at filmstrip, which, quite unreasonably, are not raised in connexion with motion-picture film. A good filmstrip is scripted and produced along lines strictly comparable with those of a film, yet the critics object to the rigidity of filmstrip, forgetting that far less effort is involved in alterations of sequence in a strip than in recutting a film. The close technical connexion between filmstrip and the miniature slide is overlooked; and, unless they are considered together, artificial limitations will be ascribed to one or the other. With a growing understanding of these media, 35 mm. technique promises to play as important a part in our medical teaching as it already does in the United States.

Motion Picture.—Reference has been made to the film as a recording medium. When a recorded case is dismissed, not only have the films intrinsic value for teaching but selected frames can be enlarged and either filed with the history or used to illustrate published work. Fig. 6 shows the extremes of movement in a case of slipped femoral epiphysis. Under such conditions photographic quality of the prints is not good, but they are of value when the film itself cannot be projected (Ollerenshaw 1938). As clinical material accumulates, addition of suitable continuity sequences, caption, and diagram makes possible the building up of complete teaching films (Ollerenshaw 1939, 1947).

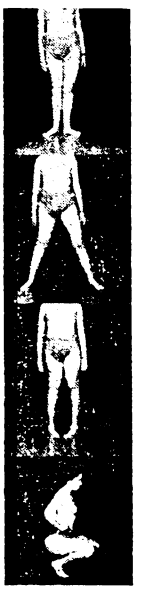

Fig. 6—Frames from a 16 mm. motion picture case-record: extremes of postoperative movement in slipped epiphysis.

THE MEDICAL ARTIST

Although not photographic, the work of the draughtsman is germane to the discussion. The medical artist is a most important member of the team. Many teachers favour this method of illustration, for unwanted detail may be eliminated with comparative ease, and a drawing may embody facets of several cases. If the artist works alone he may have to work from rapid and inadequate sketches, with much consequent revision, and it can be to his advantage to collaborate with the photographer in the production of a series of small key-prints from which he can work at leisure. The draughtsman has a very definite place in the production of teaching-aids; in the layout of displays, in the production of continuity frames for filmstrip, and in the supervision of animation sequences for motion pictures his essential value to the department will not be overlooked by his colleagues.

SUMMARY AND CONCLUSION

Photography is playing an increasingly important rôle in the medical sciences. So far, few teaching hospitals

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are making the best use of their photographic units. Means of improvement are suggested. The subject as a whole has been divided into the following three main headings: (1) routine recording with (2) filing as the logical connecting link between records thus obtained and (3) the adaptation of records to education in medicine.

References to other work are given where it has been felt that insufficient information could be imparted in limited space, but there has been no attempt at a comprehensive bibliography. It is only through a complete understanding of the points mentioned, and to some extent of the processes involved, that imaginative use can be made of the photographic department. The hospital staff must coöperate freely, and in return they may expect high quality records and teaching material.

We wish to acknowledge with gratitude the assistance of Miss F. E. McAdoo, of Westminster Hospital; Mr. J. Kilshaw, of Manchester Royal Infirmary; and Mr. F. Wardlaw, of the Christie Hospital, Manchester.

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BRITAIN'S CALORIE REQUIREMENTS

NUTRITION SOCIETY CONFERENCE

A CONFERENCE on British needs and resources in calories, proteins, and calcium was held in London on Oct. 25, with Mr. WALTER ELLIOT, F.R.C.P., F.R.S., in the chair.

In a paper on food requirements Mr. E. R. BRANSBY, PH.D., Dr. H. E. MAGEE, and their co-workers took as a basis standards suggested by the Technical Commission of the League of Nations in 1926 and 1938. The commission's reports, while suggesting a desirable level of protein intake, did not define the proportion which should be first-class; but the Mixed Committee of the League recommended that 50% should be of animal origin. Dr. Bransby held that the recommendations which had been made on the amount of animal protein to be included in the diet had not been supported by experimental evidence; his estimates of requirements were based on prevailing dietary habits. He and his associates have worked out how these requirements may be met from a diet composed of milk, meat, fish, bacon, offal, eggs, cheese, potatoes, vegetables, fruit, pulses, sugar, preserves, sweets, cereals, and fats. To bring the nutritional level of the British people up to that considered desirable in the light of the League's recommendations the following percentage increases on pre-war consumption would be needed:

	Increase %
Dairy products or milk solids	48
Sugar	14
Meat, fish, eggs	5
Potatoes	56
Vegetables	27
Fruit (as fresh fruit equivalent)	1
Grain	6
Fats	Nil

Prof. JOHN BEATTIE had found in Germany that men fed on a diet of 1750 calories lost weight for about four months, at the end of which they reached nitrogenous equilibrium, in which it seemed they would remain indefinitely. They could in fact be maintained in equilibrium on a daily intake of 35 calories and 0·5 g. of protein per kg. body-weight. Placed on forestry work they lost weight even though given an extra 500 calories a day; this was because most of the extra calories were used not for work but for raising the basal metabolic rate. Professor Beattie felt that if the population of Britain were reduced to a low nutritional level, a great deal of extra food would be needed when the attempt was made to bring it back to a proper working level because of the amount required for raising the metabolic rate.

Mr. E. C. OWEN, PH.D., suggested that Dr. Bransby had been liberal in recommending 1 g. of calcium per day. He himself had observed that in elderly men calcium balance could be maintained on an intake of 0·53 g. per day, and in very old men on 0·29 g. per day; but individual requirements varied widely. He suggested that care should be exercised in estimating requirements of animal protein in the light of recent research which had shown that glycine was present in animal protein but absent from many vegetable proteins.

TRAINING COURSES AT ROFFEY PARK

THE work of Roffey Park Rehabilitation Centre has already been reviewed in our columns.[1] This centre, under the direction of Dr. T. M. Ling, provides treatment and reablement, in very good surroundings, for workers who break down, or prove unequal to their jobs, as a result of industrial fatigue, depression, nervous disorders, or other occupational and psychological troubles. Patients usually stay some six or seven weeks in this attractive country house, set in beautiful wooded grounds; during that time they are studied physically and psychologically, are helped to find congenial occupation in the various workshops, are built up physically by a first-class diet and by physical training in the gymnasium, and enjoy rest and recreation as well as pleasant social life. The centre is largely supported by industry, and maintains direct contact with 180 leading firms as well as with the health services. It has now been running for nearly three years, and results of a follow-up show that some 82% of those who come for reablement have settled back into work without further difficulty.

A NEW SCHEME

A training and research department has now been established at the centre, the aim being to study the material provided by the patients who pass through it, and to spread a better understanding of them, and of the science of human relations, among doctors, works managers, personnel managers and other industrial officials, trade-union officials, and social workers from hospitals. Roffey Park can accommodate some 120 patients at a time; so more than 1000 pass through it yearly, all of whom are suffering from indeterminate ill health, often the result of psychological maladjustment. They thus offer wide opportunities for study.

Training courses last a fortnight, and the syllabus falls under two heads: (1) maintenance of fitness at work; and (2) special problems of reablement and resettlement. The members—who are drawn from all the classes mentioned above—attend lectures and discussions, see films and filmstrips, study case-histories, and have appropriate cases demonstrated to them. Plenty of time is allowed for free discussion among the members, for they have much to teach each other and often much to learn. Members with special experience are asked to give talks on their own subjects.

In the current course, for example, a member talked of "Training Within Industry" (T.W.I.) which many large firms are now introducing. The first step, he explained, is the training of trainers; and he discussed in outline the sort of course which supervisors—whether they are managers or charge-hands—need to take. They must, he said, be familiar with the work and with responsibility, and must be skilled in instructing, in improving methods, and in leading. Each supervisor must prepare the worker for the new job, demonstrate the operation, watch him try the operation, and follow his progress. To improve training methods, he must know how to "break down" the job, so that he can consider it at every stage. These common-sense principles, however, are not always easy to apply in the rush of the day's work; and in the keen discussion which followed the talk it became clear that supervisors sometimes slip back, and also that some managements pay lip-service to T.W.I. without giving it real support. Yet a good adjustment to a new job depends greatly on good preparation for it; and a bad start may be the making of a "misfit."

The team conducting the course consists of Dr. R. F. Tredgold, psychiatrist; Mr. Jerome F. Scott, an American industrial sociologist who trained at Harvard under Prof. Elton Mayo; and Miss J. Kirby, the social worker attached to the centre.

1. *Lancet*, 1945, ii, 607.

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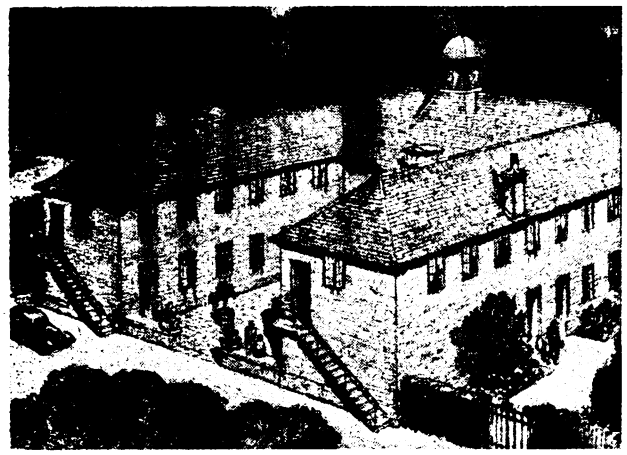

The new club for those in training.

QUARTERS

While taking the course members live in a clubhouse on the estate. Victorian stables have been converted into quarters which have the atmosphere of a college rather than a training centre. Financed by British industry, and by generous donations from various American funds—including the Rockefeller, the Vesey, and the Commonwealth Funds—and some American business firms, this building is a harmonious background for free discussion in the evenings and at odd moments. Since many of the furnishings come from America it has escaped the air of austerity investing most British enterprises nowadays.

The aim of the courses at Roffey Park is to bring to life the material collected laboriously into Government and other reports—notably those of the Industrial Health Research Board—and too often forgotten before a year is out. This is a first attempt to disseminate the findings of such bodies among those who can use them practically, and in fact to study and teach all of mental health in industry. It deserves success.

INTERVERTEBRAL DISC SURGERY

Principles and Results

IN a Hunterian lecture at the Royal College of Surgeons on Oct. 17, Mr. MURRAY FALCONER said that the results of operations on the intervertebral discs in the past have been inexplicably variable. Large prolapses may be removed with an indifferent result, while great relief has often followed a disappointing exploration. Surveys of large series have always shown satisfactory results in less than 75–80% and often in as few as 50% of cases. Competent surgeons have recorded negative explorations in as many as a fifth to a third of their cases, and in many patients symptoms have persisted whatever the operative findings.

Mr. Falconer has analysed the first 100 consecutive operations performed at the neurosurgical unit established at Otago in 1943. In every one of 77 patients with severe sciatica one or more prolapses were found, and all ultimately benefited, though 9 had to be operated on again. In 23 with low back pain alone only 1 exploration was negative, and all but 2 were relieved by operation. Factors governing the success or failure of disc operations and under the control of the surgeon include selection of cases, exposure, recognition and removal of the lesion, and management of convalescence. In selecting cases it must be remembered that acute symptoms mostly clear up spontaneously—only 1 in 9 of these came to operation—and intervention is indicated only if four weeks' complete rest in bed leaves the patient unrelieved and unfit for light work, and if the radiogram excludes tuberculosis and neoplasm of the spine. Cases should not be excluded because psychoneurotic features develop on a physical basis; many of these have done surprisingly well. In patients with low back pain alone selection must be much more cautious; only when, besides a rigid spine and intractable symptoms, there is a positive myelogram should exploration be performed.

Regarding surgical exposure, Mr. Falconer holds that the old interlaminar approach gave an inadequate peephole view which was often the cause of failure to detect the lesion. A full laminectomy, with removal of the 5th lumbar arch and the lower part of the 4th, was done in most of his cases and gave the best results, leaving no disability or incapacity for hard work. Recognition of the lesion demands acquaintance with the four main types of pathology. There is the simple protrusion, covered with a thinned annulus, and the extrusion through the annulus, often pedunculated. Then there is the important intermittent prolapse, equivalent to Dandy's "concealed disc," which looks normal, though it is soft to the probe and may not even bulge until the spine is hyperextended on the table; it is important to recognise and remove these, for they formed 20% of the whole series. Finally there are the 5% of scarred discs, greatly narrowed over the years and associated with osteophytic outgrowths on the adjacent vertebral borders. It is necessary to explore both the 4th and 5th spaces in all cases, and 27 patients had a double lesion. Thorough curettage is essential, for any loose material left in the interior of the disc may be extruded later through the operative gap in the annulus under the stress of weight-bearing. So curettage should be done from both sides of the theca whenever the prolapse extends towards or beyond the midline. Removal became more radical with experience in the Otago series, and it should include the cartilage plates so as to leave bare bone approximated. Cadaver experiments have shown that much more material can be removed by a bilateral approach, though this still leaves a blind angle directly in front of the theca. There is a real, though very small, risk of the curette emerging anteriorly and endangering the great vessels.

Spinal fusion is unnecessary, in Mr. Falconer's opinion. At first, in his operations for low back pain, his orthopædic colleagues fused alternate cases as a control; but this was soon abandoned because the grafts often broke or demonstrably failed to fuse to the sacrum, owing to the great stresses at this level, and the unfused cases had a smoother convalescence. It is important to begin exercises for the wasted erector-spinæ muscles at the eighth to tenth day; light work is resumed in two to four months and heavy work in four to six months.

From the aspect of differential diagnosis, the hypertrophied ligamentum flavum is merely the thickening of a relaxed ligament associated with a disc prolapse; it has never been seen without prolapse. Arachnoiditis and radiculitis are always secondary to the root compression. Cauda-equina tumours can be differentiated by myelography, and spinal tumours are usually sufficiently obvious; but a real, though rare, hazard is the small tuberculous focus encysted partly in the disc and partly in the adjacent vertebral body. In one such case death from miliary tuberculosis ensued after curettage.

Re-operation is called for whenever disabling symptoms persist or recur, and was done on 14 occasions. Such persistence or recurrence must indicate residual loose fragments whether they were missed at the first operation or have developed since, or have appeared at another level. A 100% follow-up has shown results very similar to those generally reported with another mechanical, non-lethal, incapacitating skeletal disorder—internal derangement of the knee-joint. Good (60–75%), fair (15–25%), and poor (5–10%) results were much the same in both. In both groups re-education of muscle is important and there may be late osteo-arthritis of the joint, though in the spine there is the added risk of pathological changes in another disc.

The essential points in disc surgery, Mr. Falconer summarised, are these. Adequate exposure usually calls for a laminectomy. The pathological appearances must be familiar, especially those of the intermittent prolapse. All readily detachable material must be removed, if need be from both sides. The erectores spinæ must be re-educated. Finally, there must be no hesitation to re-operate if disabling symptoms persist or recur.

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In England Now

A Running Commentary by Peripatetic Correspondents

MUCH has been written about the hazards of an assistant's life in general practice, but worst of all are the appalling vehicles with which one is expected to perform one's duties. At the end of one of my earliest locums for an irascible Irishman he inquired how I was getting on with his "so-and-so patients." "All right," I replied, "but not so well with your so-and-so car." (It was 17 years old and had been driven hard.) "Faith, an' it *is* a so-and-so car," he muttered complacently setting off for the pub in his new Lagonda. Once I had to greet him on his return from a holiday with the news that owing to my tardy diagnosis one of his pet private patients was very ill with diphtheria. He patted me consolingly on the back, saying "Never mind, my dear, we all make mistakes. Now when I was a young doctor I remember. . . ." His voice trailed away and then suddenly hardened as he caught sight of a minute dent on the mudguard of his 80,000-mile Standard. In an altered tone, he said "Really, Doctor, I think you might have been more careful with my car."

The new graduate about to take an assistantship "with car provided" should not be put off with the statement, "It has just had a new engine." There are plenty of things besides the engine which can go wrong, as you'll find out. Beware of the employer who tells you, "There's nothing radically wrong with this car." There must be, or he wouldn't need to mention it. Always put the leading question, "How does it start in the mornings." If the answer is "Oh, very well, if you leave it on a hill," look out for another job or buy your own car.

I will end with a story which contains a warning for all mothers about to undertake general practice. The boss was talking about the difficulties of getting an adequate diet for the nursing mother. "I take off my hat," he remarked, "to any woman who can breast-feed a baby on present-day rations." I reminded him that I had breast-fed three in the last four years and awaited a murmur of admiration. It came, but in an unexpected form. "Why, you must be as strong as a horse, doctor." And after a pause, "You won't mind starting the car with the handle in the morning; it would be expensive to get the self-starter repaired."

* * *

The day after I was demobbed I went through my old trunk to get rid of the accumulated junk, and a charming letter from Leading-seaman B reminded me of that day in June, 1944.

It was about 10 days after D-day, off the Normandy coast, and the ship was rolling and pitching when I was called to the sick-bay to see B who presented typical early symptoms of acute appendicitis. I put him to bed and then asked the Old Man how soon we could get him ashore—but not a hope. We were Senior Officer of a group of frigates (how annoyed I used to get when people asked me how many sails a frigate had!), and we had to remain on patrol. I then read up appendicitis and examined the patient again and became even more worried as I decided it was retrocæcal.

I surveyed my equipment—or lack of it—and made plans. No steriliser, no sterile gowns, &c.; so I sent for the Chief P.O. cook and we wrapped some gowns and sheets in canvas and put them in his oven, and I commandeered his steamer for instruments, gloves, and swabs. Returning to the sick-bay I was just in time to save the patient from being castrated by a shaky S.B.A. who was trying to "prep" him with a fiendish-looking knife. How easy it would all have been in hospital, I thought. Just a few words on the phone and all this is done—ready for the surgeon's arrival. It would do some surgeons good to do the preparations for their own operations once in a while.

After some argument, I persuaded the First Lieutenant to be anæsthetist and a couple of subbies to be "dirty nurses"; the S.B.A. would assist. The Old Man slowed to 9 knots, and put her bows into it, and I, having read up appendicitis for the tenth time, started the anæsthetic at 2300 with the patient strapped to the table. The patient "under" I scrubbed up, picked up the scalpel, and made the incision—right paramedian—much to the annoyance of the patient, who was quite conscious. Number one had decided that I had given too much ether and thought that one drop a minute was enough; having persuaded him to be more liberal, I started again.

Things proceeded nicely until one of the subbies fainted, and later when I was reaching for a Spencer Wells the other subby put his dirty fist into the dish and gracefully presented me with one. I only had three so I had to use it.

The appendix *was* retrocæcal and the very devil to get out, but wasn't I pleased when I saw what a horribly pathological thing it was? I popped it into spirit afterwards and kept it.

I was just finishing the purse-string when a messenger came from the Old Man with a warning that we were altering course and speed; a moment later "Action Stations" rang. Away dashed my anæsthetist and dirty nurses, leaving the S.B.A., the patient, and myself. As we swayed and reeled, I managed to stitch up while the ship did a depth-charge attack. Eventually all was finished, and for good measure I fixed up a glucose-saline drip with the bottle tied to the deck-head with my braces. Three days later we landed our patient at Falmouth and a fortnight after that he went on sick leave.

I never told anybody that it was my first appendicectomy. After qualifying I'd done H.P. only for six months. But I thanked my lucky stars for that student H.S. I did before qualifying. I had at any rate assisted often enough.

* * *

No doubt, Mr. Editor, you imagine that, as soon as your journal arrives, we readers turn avidly to your leading articles and gratefully imbibe your latest words on the political crisis or on some new and important discovery. You may find it hard to credit that anyone is so misguided as to begin with the Peripatetic correspondence. As a man of method, this is, I confess, my custom. But, unlike the weaker brethren, I can add that I do not stop there. My second port of call is Letters to the Editor—sometimes made less profitable by my inability to remember what was said last week. Thence I turn back to the annotations and so to the leaders, which (now that I am old) I read with interest. Duly strengthened, I go back yet further to the Original Articles, finishing, contrarily, with the first, and nowadays skipping the gynæcological and surgical ones, unless a new operation on the prostate is described. Finally—you will never forgive this, Sir—I proceed to tear out the articles which concern me. (I am afraid it is too much to hope for, but I do wish you would not put two articles on different medical or pathological subjects on successive pages; it makes the filing so difficult.) If an article is lucky it goes at once into an appropriate folder, or into a lecture folder for careful re-reading when next I am to talk on its subject; otherwise it goes into a drawer to wait until I have the time to distribute the pages in my filing cabinet. (My drawer is very full.) The rest goes into the wastepaper basket; and if I am not too busy, or on holiday, the whole *Lancet* is thus disposed of by Monday night.

I just thought you might like to know.

* * *

He said he had bronchitis; but when he had taken off his turban and voluminous garabeya all I found was that he had my mosquito-net and sheets as a fine set of underclothing. What is the medical etiquette in such a situation? I felt I must observe the secrecy that is the right of every patient. After all, he only revealed my property en passant, on his way down to his chest. I wistfully snipped my name from his vest and sent him back to duty—for he had nothing (else) the matter with him. Why should I give him both a holiday and the finest linen combinations in the Sudan?

* * *

The discovery of a new clinical phenomenon is a sufficiently rare event to be worth recording.

In the history of a patient newly admitted to hospital I read that he had noticed that his urine had turned green. I observed to my house-physician that he had no doubt been taking backache pills containing methylene-blue, but was informed that the patient had hæmaturia and was colour-blind.

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Letters to the Editor

PENICILLIN AND INFECTIONS OF THE FINGER

SIR,—I was interested that Dr. Webster (Oct. 25) had treated paronychias by infiltrating the nail-fold with penicillin solution but had found the treatment an uncomfortable one for the patient. Nevertheless an experiment of this kind would be well worth while if, while not being too painful, it could obviate the necessity for removal of part or all of the nail, as is so often recommended. The pulp of the finger has lost much of its usefulness to a manual worker if the strong support and counter-pressure afforded by the nail is removed.

Where in these chronic paronychias pus is discharging from the sulcus between fold and nail, an effective treatment is to instil gently a few drops of penicillin solution into this sulcus. A hypodermic needle from which the point has been filed is a useful means of doing this. This sulcus is surprisingly deep in these cases, and if a little patience is exercised it is possible to slide the blunt needle down and perform the instillation with no great discomfort. But the nail-fold itself is not infiltrated. One or two treatments are often quite sufficient to cure, especially if an adhesive waterproof dressing is applied immediately after the treatment.

I do not think that the hospital treatment of late cases with systemic penicillin reflects the great advance that this treatment has bestowed upon the early case. My industrial experience is that more cases resolve than ever before without suppuration; but the chief benefit is that further spread of infection is discouraged. The staphylococcus would seem to produce necrosis very quickly, so that an "early" septic finger may already have a slough in the tissues by the time that treatment is started. In fact the clinical appearance of an early lesion is possibly as much due to reaction to slough as to reaction to infection. But in industry one can catch cases so early that this necrosis should be minimal.

Oxford. G. WHITWELL.

ABUSE OF THE EMERGENCY BED SERVICE

SIR,—Nobody cavils at Dr. Herbert (Oct. 11) sending a suspected case of appendicitis to hospital. But surely it is helpful both to the patient and to the surgeon, who has to make the final decision, to transmit all possible information about the case. It would have taken but a few minutes to note the time of onset and the site of the pain, and the temperature, together with the abdominal and rectal findings. Since the patient did not arrive at hospital until "several hours later," the value of such a record would have been so much the greater.

I remember a patient I admitted once for an outside doctor. He arrived one Sunday afternoon while I was engaged on an accident case and was sent straight up to the ward. Half an hour later he was dead from toxæmia. The doctor's laconic note said: "Septic hand for two days—requires hospital treatment." For that pleasantry I had to answer in the coroner's court. Can Dr. Herbert wonder, therefore, that Dr. Kagan should have reached the conclusions he gave in his letter on Oct. 4?

At the same time I should like to remark on the petty feud that appears to exist between some general practitioners and casualty officers. Even one of your peripatetic correspondents vented his spleen along these lines recently. Casualty officers are not appointed for the sole purpose of vexing their seniors in general practice. Even with the help of nurses and almoners they are as busy as, if not busier than, the average general practitioner. Westminster Hospital is one of the smaller London teaching hospitals; but I recall that, when I was R.M.O. there, two other casualty officers and myself saw between 3000 and 7000 patients a month, according to the season of year. Those are figures for actual attendances—not possible attendances from a panel list. Of these, a higher proportion needed admission than in general practice. Casualty officers often have greater difficulty than G.P.'s in finding a bed for a patient, and many a time have my colleagues and I been profoundly thankful for the services of those courteous ladies of the E.B.S.

We "omniscient juniors" are fully aware of our shortcomings and realise that we can learn only by experience and the example of others. But what can we learn from a case of "appendicular colic" sent "for observation and, if necessary, surgery" with an illegible note describing it as "acute appendicitis" but without reference to a single relevant clinical finding? We might do much worse than "wag a finger"—we might imitate.

London, S.W.17. CHARLES M. FLOOD.

ORIGIN OF CEREBRAL SURGERY

SIR,—As a student at King's College Hospital in the earlier '80s I was present when Sir Joseph Lister, as he then was, operated on a case of cerebral tumour. I can see now Ferrier (for whom I "clerked") proceeding to indicate the position of the tumour in the left parietal region, and the restraining hand of Lister preventing actual contact with the patient.

As to the precise date I cannot certify, but doubtless the surgical registrar at King's College Hospital could establish the priority or otherwise of Rickman Godlee's operation. We understood at the time that it was the first operation of the kind.

Farnborough. M. P. HOLT.

SECOND ATTACKS OF POLIOMYELITIS

SIR,—The interesting letter from Colonel F. M. Lipscomb and the annotation in your issue of Oct. 11 prompt me to record briefly a further case, which is at present under my care.

The patient, a boy aged 9, was admitted to the Kingston County Hospital on Sept. 23 with a history of headache, vomiting, neck stiffness, photophobia, and general malaise for the past two days. The boy had had a definite attack of poliomyelitis in September, 1946, with involvement of muscles in the left arm and right leg, and residual weakness in the left deltoid and right anterior tibial muscles. On admission: temperature 100·2°F, pulse-rate 112 per min., respiratory rate 23 per min. The cerebrospinal fluid showed normal pressure and contained 69 cells per c.mm., all lymphocytes, and 30 mg. protein per 100 ml.; the Wassermann reaction was negative. Three days later the boy developed marked weakness of the muscles of the right forearm and hand—muscles which were not affected at any time in the previous attack of poliomyelitis. The pyrexia persisted for about seven days, but the temperature has since been normal.

This is a case in which a second attack of poliomyelitis has come on just over one year after the first attack.

Kingston County Hospital, Kingston-on-Thames. A. A. CUNNINGHAM.

COAGULATION FACTORS

SIR,—My associates and I consider your leading article on Sept. 13 to be misleading and inaccurate.

Rhoads and Panzer,[1] not Quick, were the first to show that the prothrombin-time steadily increased as plasma storage was prolonged. This was cautiously interpreted to mean a decrease in prothrombin concentration. Quick [2] confirmed the erroneous interpretation. Those who used the more reliable two-stage method for measuring prothrombin activity found prothrombin to be relatively stable in blood-bank blood.[3] Quick abandoned his view which held that prothrombin disappears in blood-bank blood. He postulated that there are two prothrombins and that one of these disappears in storage plasma.[4]

Meanwhile isolation work on prothrombin described by Seegers, Loomis, and Vandenbelt [5] showed that Quick's theory could not be correct because their work showed no evidence for a second prothrombin. They stated: "It, therefore, seems to us that his experiments will eventually be reinterpreted." In his many subsequent communications Quick failed to cite the work of

1. Rhoads, J. E., Panzer, L. M. *J. Amer. med. Ass.* 1939, **112**, 390.
2. Quick, A. J. *Ibid*, 1940, **114**, 1342.
3. Lord, J. W. jun., Pastore, J. B. *Ibid*, 1939, **113**, 2231. Warner, E. D., DeGowin, E. L., Seegers, W. H. *Proc. Soc. exp. Biol., N.Y.* 1940, **43**, 251. Ware, A. G., Guest, M. M., Seegers, W. H. *Amer. J. Physiol.* 1947, **150**, 58.
4. Quick, A. J. *Ibid*, 1943, **140**, 212.
5. Seegers, W. H., Loomis, E. C., Vandenbelt, J. M. *Arch. Biochem.* 1945, **6**, 85.

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Seegers, Loomis, and Vandenbelt. Fantl and Nance [6] confirmed the conclusion of Seegers, Loomis, and Vandenbelt and not, as you state, the work of Quick. Fantl and Nance also showed that an accelerator factor increases the activation rate of prothrombin. This observation has been confirmed by Owren [7] and by Ware, Guest, and Seegers.[8] The fact that prothrombin-conversion rate is profoundly affected by the plasma was repeatedly referred to by Smith and his associates, [9] and in one communication Smith stated: "Recent work indicates that the rate may also be determined by a 'convertibility factor' of unknown nature." [10]

In 1946 Quick [11] abandoned the theory of two prothrombins, and referred to the old prothrombin A as "component A." This component A now becomes the labile factor.[12] In another communication Quick [13] presumes that component A is identical with the accelerator factor of Owren. The accelerator factor would then need to be labile. Owren reports that 60–70% of the accelerator factor remains at the end of one week of storage. The question is whether Quick would adjudge that to qualify the accelerator as a labile factor. Our own work with bovine plasma shows that the accelerator is stable and can be isolated after 18 days' storage.[14]

From all this work we can now conclude with certainty that only one prothrombin exists and that a factor accelerates the interaction of prothrombin and thromboplastin. The account given above records who established these facts.

WALTER H. SEEGERS.

Wayne University, Detroit, Michigan.

PRIVATE WARDS IN HOLLAND

SIR,—The concluding sentence of my previous letter (Oct. 4) did not make my point clear enough.

Your correspondent in his article on Sept. 6 (p. 363) expressed the view that if private wards or private rooms for patients who pay higher rates are incorporated in hospitals with ordinary wards, these private wards and rooms should not be brought together in separate blocks or units but should be distributed over the units with ordinary wards.

Our experience in Holland (where there is a strong feeling against nursing-homes and where for a number of years very many hospitals have had combined ordinary and private wards) is that combining private and ordinary wards in one nursing unit makes for difficulty in nursing and administration and provokes jealousy among patients in ordinary wards, due to different visiting hours. Our experience shows that the separation of ordinary wards from private wards does not interfere with the achievement of the same standard of nursing and care in both units; and it does not mean that in the same hospital the one department is better managed than the other.

Deaconess Hospital, Meppel, The Netherlands. J. C. J. BURKENS Medical Director.

THYROID AND LACTATION

SIR,—I should like to comment on Dr. Margaret Robinson's article in your issue of Sept. 13.

Table II gives the mean daily output of breast-milk for each group of 20 mothers, but not the variance of the individual figures; this makes it impossible to apply the precise *t*-test for the significance of the variations between the means. The absence of the detailed data also makes it impossible to work out a correlation coefficient for the effect of thyroid on breast-milk; calculation of the coefficient for the means as given suggests that the effect, though definite, is but slight. There is obviously no correlation between milk output and the dose of thyroxine (table III).

Is it not possible that these huge doses of thyroid may have spilled over into the breast-milk, stimulating the nursling to suckle more vigorously, and so improving the milk-flow? And is Dr. Robinson satisfied that lactation is established, when the daily output at one month is 13–14 ounces (the average of the figures)? I doubt if the month-old baby would be. I consider that her interesting experiment does not warrant her sweeping conclusion; it would be more accurate to say that thyroid produces a variable and inconstant increase in the milk-flow, and to leave it at that.

London, N.W.3. E. HINDEN.

THE NEW ZEALAND SCENE

SIR,—Further advices from New Zealand reveal that all the schemes for the (partial) general-practitioner service which have been essayed from time to time during the past eight or ten years are now in the discard. A new committee is to be established to review the whole situation afresh, and it is perhaps significant that the minister of health who held this office throughout the period in question has now been replaced. The break with the past seems to be complete.

A letter in the *Daily Telegraph* of Oct. 1 from a resident in New Zealand fully supports the statements I made in my letter of Sept. 20 to you (p. 452). I have had a further communication, dated Sept. 30, from a major in the R.N.Z.M.C. who also confirms those statements. He adds that "no young doctors will join the R.N.Z.M.C. for service in Japan" (where he is now stationed) "as the prospects of general practice are too attractive, with their seven and sixpences ad infinitum for even the most junior man," and in consequence of the absence of volunteers from New Zealand it has been decided to recruit further medical replacements for this corps in England!

House of Commons. E. GRAHAM-LITTLE.

MANGANESE TREATMENT OF BOILS

SIR,—There seems to be a growing tendency, with the almost daily introduction of new treatments, to neglect older and well-proved methods. For many years I have found the best, easiest, and most economical treatment of furunculosis and allied staphylococcal conditions to be manganese. During more than six years' service in the Royal Air Force large numbers of men and women came under my care, including, of course, many cases of staphylococcal infections and furunculosis, especially among the younger and adolescent groups. The important thing was to keep as many as possible on the job while still undergoing treatment. No attempt at a controlled trial was made, but the treatment of choice was agreed to be colloidal manganese, except in the rare acute cases where admission to hospital for penicillin treatment was resorted to.

Dosage varied according to the predilection of different medical officers, but in my own experience a course of six injections of 1 ml. at three-day intervals was the most successful and produced no toxic effects. The injection was given intramuscularly into the upper deltoid, the muscle well massaged, and the patient told to use the arm as much as possible. It was rarely necessary for a second course of treatment to be given, and I do not remember a third course being embarked on, though with the constant movement of personnel this could have happened without my knowledge.

Colloidal manganese is easily stored, easily carried, and economical; change of temperature does not affect its efficacy, and its non-viscous nature allows an ordinary hypodermic needle to be used for the injections.

There is no precise rationale for the use of manganese therapy in staphylococcal infections, though, since the metal plays an essential rôle in certain enzyme systems,[1] it seems possible that it acts by interfering with the nutrition of bacteria by some mechanism not unlike that of sulphonamides. But the proof of the pudding is in the eating, and I should be sorry to see this form of treatment disappear from the armoury of the general practitioner.

Sheffield. E. C. FOOT.

1. See *Nutr. Rev.* 1945, **3**, 174.

6. Fantl, P., Nance, M. *Nature, Lond.*, 1946, **158**, 708.
7. Owren, P. A. *Lancet*, 1947, **i**, 446.
8. Ware, A. G., Guest, M. M., Seegers, W. H. *J. biol. Chem.* 1947, **169**, 231; *Science*, 1947, **106**, 41.
9. Warner, E. D., Brinkhous, K. M., Smith, H. P. *Proc. Soc. exp. Biol., N.Y.* 1939, **40**, 197; *Amer. J. Physiol.* 1939, **125**, 296. Seegers, W. H., Brinkhous, K. M., Smith, H. P., Warner, E. D. *J. biol. Chem.* 1938, **126**, 91. Owen, C. A., Hoffman, G. R., Ziffren, S. E., Smith, H. P. *Proc. Soc. exp. Biol., N.Y.* 1939, **41**, 181.
10. Smith, H. P. Essays in Biology, Berkeley, California, 1943, p. 549.
11. Quick, A. J. *Proc. Soc. exp. Biol., N.Y.* 1946, **62**, 249.
12. Quick, A. J. *Lancet*, Sept. 13, p. 382.
13. Quick, A. J. *J. Amer. med. Ass.* 1947, **134**, 826.
14. Ware, A. G., Guest, M. M., Seegers, W. H. *J. biol. Chem.* 1947, **169**, 231.

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MEDICAL JOURNALS FOR GERMANY

SIR,—We frequently receive appeals from German doctors for copies of THE LANCET and other medical journals. They know that in many fields advances have been made since 1939, but since then foreign medical periodicals have been practically unobtainable.

May I appeal to your readers to send any issues of THE LANCET (or other journals) which they do not require to doctors in Germany? We shall be glad to receive them at this office, or would send the name and address of a doctor or hospital on hearing from interested readers.

German Educational Reconstruction, 15, James Street, Long Acre, London, W.C.2. ERICH HIRSCH Secretary.

A DESCRIPTIVE ATLAS OF RADIOGRAPHS

SIR,—Your review of May 17, in quoting my remark about "vociferous radiologists who wish to keep radiology as a closed art, a mystic rite," omits to mention that I described them as a "fortunately dwindling number." If the radiographs in my descriptive atlas are as poor as your reviewer suggests, it is indeed brave of him to doubt the accuracy of the diagnosis, which in most instances was made by the clinician in charge of the case. I admit that many of the figures, especially in the bone section, are old. During the last twenty years treatment has advanced so much that what were once common diseases are now almost museum pieces—e.g., rickets, syphilis, osteomalacia, osteomyelitis, varicose-ulcer changes in bone, and Ewing's tumour.

Maxwelltown, Dumfries. A. P. BERTWISTLE.

Parliament

FROM THE PRESS GALLERY

Debate on the Address

IN the House of Commons on Oct 21, in moving that a humble Address be presented to the King thanking him for the Gracious Speech from the Throne at the opening of the new session, Mr. W. R. BLYTON welcomed the proposals made in it for ending the poor-law. That Act, which originated in the reign of Queen Elizabeth, had been revised and amended many times, but the basic principle had always been that poverty was a crime. People had shunned receiving assistance under the poor-law and he was pleased to be able to play some part in burying the Act. Miss M. HERBISON, who seconded the Address, welcomed the Government's continued support of the United Nations Organisation, and of the aim of the Food and Agriculture Organisation to give an adequate diet to every person in the world no matter what might be his race, creed, or colour. We must see to it, she added, that Sir John Boyd Orr's fears that this organisation would merely be a collector of statistics and data were not realised.

Mr. C. ATTLEE, the Prime Minister, said the Government's legislative programme for the coming session completed a system of social security by the abolition of the remnants of the poor-law. Another important measure which the Minister of Health would introduce dealt with the reform of the block-grant system. This would be of great assistance to necessitous local authorities.

Sir H. MORRIS-JONES questioned whether we could maintain a population of 47 million people in this country on the standard of life which we used to have in the old days, and in particular he doubted whether the insurance legislation passed last session could be brought into operation on July 1 next. In regard to the health services alone it seemed to him completely impossible in view of the lack of accommodation in hospitals, the lack of medical and nursing personnel, and the lack of equipment to bring into force the scheme which was supposed to guarantee to every individual, man, woman, and child, in this country expert medical attention, nursing, dental services, and so on. If the Government were not in a position to bring these things about, it would be very much better for them to be quite frank with the people and say so.

Mr. R. A. BUTLER, speaking for the Opposition, said that the proposal to reform the poor-law entailed the completion of social security work undertaken by the Coalition Government. The real threat to the social services came from the maladministration of the Socialist Party. If the Chancellor of the Exchequer should decide to reduce the range of the food subsidies the Conservative Party would be in favour of considering the interests of the most needy sections of the population in view of the heavy rise in the cost of living which would result.

Sir STAFFORD CRIPPS, Minister for Economic Affairs, said we must take steps to prevent the large adverse balance in dollars being realised. There was an ever-present danger that continued difficulties, and the lack of food and raw materials with its consequent tragic lowering of the living standards, might lead people, as had been seen in Germany after the first world war, to adopt methods and follow political creeds which were destructive of democracy and which accentuated those dangers of war against which we believed that a true democracy provided the greatest safeguard.

It was on our own efforts, said Sir Stafford, that we intended primarily to rely, and the most effective way of saving dollars was by the production of more food in this country. Food was the largest single item among our present dollar purchases and any food that we could grow ourselves would save dollars. But there must also be some immediate further reduction of dollar expenditure on food, which, if not replaced from elsewhere, would—with other changes brought about for quite other reasons—reduce our standard to just below 2700 calories a day, which, though highly unpleasant, should certainly not be disastrous. That would enable us to save about £66 million a year in dollars. In making these adjustments in our imports, the Government had to take into account the fact that the country had suffered the grave misfortune of a bad potato harvest. They must take strict measures to see that supplies lasted till the next crop was available. The saving would entail the following reductions in our food:

Sugar would revert to 8 oz. a week from the 10 oz. to which it was recently raised; meat would remain at 1*s.* a week; bacon would remain at 1 oz. a week, and there would be a saving on eggs which would enable a distribution to be made of 66 shell eggs compared with 58 last year, with an earlier exhaustion of dried egg stocks.

If circumstances improved, he added, or if matters were eased for Europe and the world by the adoption of some scheme under the Marshall Plan, then the British Government could always reconsider the matter, and, if necessary, increase our imports again. But he was convinced that it was necessary to take this step of further adjusting our consumptions and imports forthwith.

Mr. H. DALTON, Chancellor of the Exchequer, announced that the National Insurance Act and the National Health Act, both passed last session, would come into operation in July and would not be delayed. Taking account of the transfer of hospitals from local to national funds, the ending of the poor-law, and the new block-grant, there would be a substantial reduction of the rates in many parts of the country, and particularly in the poorer industrial and rural areas. This would be a valuable measure for laying a foundation for the recovery of industry.

QUESTION TIME

Meetings of the Negotiating Committee

Sir E. GRAHAM-LITTLE asked the Minister of Health how many times he had personally met the Negotiating Committee appointed with the approval of the Minister by the medical profession, to discuss regulations to be made under the National Health Service Act; and what was the date of the last such meeting.—Mr. A. BEVAN: These discussions have so far taken place with my officials following a procedure which I believe to be entirely acceptable to the Negotiating Committee. At their request I have arranged to meet the committee myself next month.

Working Party on Nursing

Mr. G. R. MITCHISON asked the Minister whether he had any statement to make on the report of the Working Party on the recruitment and training of nurses.—Mr. BEVAN: The Secretary of State for Scotland and I have promised to consider the views of the nursing organisations and other

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interested bodies before policy is finally formulated and these views are now being obtained. The Working Party's recommendations concern, however, long-term policy and cannot be expected to produce an immediate increase in the supply of nurses. We trust hospital authorities will, therefore, at once examine interim measures to reduce wastage and will make the maximum use of part-time and married nurses and build up their domestic staffs to relieve nurses of domestic duties.

Obituary

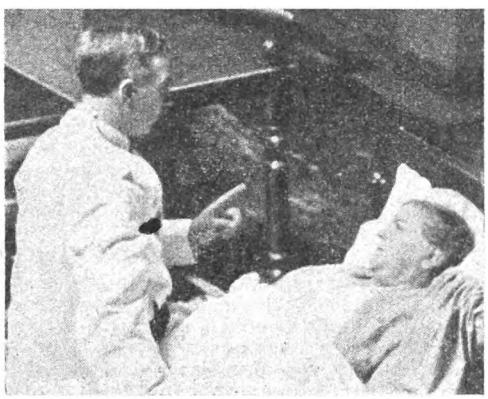
GEORGE RIDDOCH

M.D. ABERD., F.R.C.P.

AT the age of 58 Dr. Riddoch died in the London Hospital on Oct. 24 after an operation. He was a distinguished neurologist and an able teacher: but his pupils and his patients will think of him first as a person and a friend—a man of singular kindness and a good doctor. Much of what he taught is remembered because he said it, and because of the way he said it; and through his teaching at the London and the National Hospital, Queen Square, he did a great deal to improve standards of practice. To his work at these two hospitals and in two wars the following appreciations pay tribute.

* * *

George Riddoch was born at Keith in Banffshire. After a distinguished career as a student he qualified at Aberdeen University and came to London just before the 1914 war. He obtained his introduction to neurology



as a resident at the West End Hospital for Nervous Diseases. During the 1914 war he served in the R.A.M.C. as medical officer in charge of the Empire Hospital for injuries of the nervous system, and this brought him into contact with Henry Head who at once recognised his outstanding ability. Riddoch was already well trained in anatomy, having been demonstrator in the anatomy department at Aberdeen. His association with Head launched him into the main stream of the British tradition of neurology, springing from Ferrier and Hughlings Jackson, with its dynamic approach to the subject and its intimate relationship with neurophysiology.

During the years immediately before 1914 Head, with various collaborators, had been working on problems connected with sensation at all levels of the nervous system, and not many years previously Sherrington had published *The Integrative Action of the Nervous System* which had so greatly illuminated the reflex functions of the spinal cord. The time was ripe, therefore, for the application of these new ideas to the interpretation of the rich clinical material provided by war injuries, particularly of the spinal cord. Encouraged by Head, Riddoch in 1917 published papers on "the reflex functions of the completely divided spinal cord in man compared with those associated with less severe lesions," and in the same year, in collaboration with Head, he wrote on visual perception after occipital injuries and on "the automatic bladder, excessive sweating, and some other reflex conditions in gross injuries of the spinal cord." Though opinions are still divided as to the nature of the "mass reflex" and the interpretation of some of the reflex phenomena Riddoch described, his work was a valuable contribution to the physiological interpretation of human nervous disorders, and this remained his approach in his later publications, of which the chief were his Lumleian lectures to the Royal College of Physicians, on pain of central origin, and his presidential address to the neurological section of the Royal Society of Medicine, on phantom limbs and body shape.

The end of the war saw him at the age of 30 with an established reputation as a neurologist. He recognised the need for enlarging his clinical experience and through the Medical Research Council joined the staff of the newly founded medical unit at the London Hospital, and shortly afterwards he became assistant physician to the Hospital for Epilepsy and Paralysis, Maida Vale. He now shows that he possessed the powers of logical analysis and lucid exposition of a first-rate teacher, even though at that time his native Doric was at first somewhat difficult for southerners to understand. As a teacher he laid great stress upon thoroughness in history-taking and clinical examination, and maintained that there was no better subject than neurology for the teaching of clinical methods in general. His ability was so well recognised at the London Hospital that in 1924 he was elected a supernumerary assistant physician, there being at the time no vacancy on the staff.

He now decided to enter consulting practice; and few, if any, can have attained success in that difficult sphere in so short a time. He worked indefatigably. His precision of thought not only made him a good diagnostician but enabled him to give clear-cut advice as to treatment, and his attention to detail prevented him from neglecting any measure that was for his patient's benefit. Moreover, he possessed great charm of manner, a warmth of feeling for people and an intuitive knowledge of their difficulties.

His election to the staff of the National Hospital, Queen Square, added to his opportunities for teaching, and he welcomed the international contacts which it brought.

When the last war broke out Riddoch became head of the E.M.S. neurological unit at Chase Farm Hospital, to which the neurological department of the London Hospital was evacuated. He had already been made civilian consultant in neurology to the Army, and in 1941 he accepted a commission and devoted himself to the organisation of the Army medical neurological service. In this position he worked as unsparingly as ever and did much to help those treating peripheral nerve injuries and traumatic paraplegia.

But he was a tired man when he took up this work and before long his health began to break down. He would not give in, but struggled on courageously, though latterly he must often have been in constant pain; and he was doing his hospital work and seeing patients till the week before his death.

Riddoch's place in neurology is secure, even though the very plenitude of his gifts came to favour the doctor at the expense of the investigator. In committee he was liberal in his ideas and wise in his counsel. His friends will recall his gaiety and humour; his stories, many of them Aberdonian, which set the table in a roar and at which he laughed himself till he had to wipe his eyes; and in quieter moments his love of fishing and the Rothiemay countryside, of birds, books, and, above all, music. But he lived for his work and died too young, because he spent his life so generously. It is hard to believe that he has hurried away for the last time.

W. R. B.

The untimely loss of George Riddoch will be grievously felt by his contemporaries and colleagues at Queen Square. I had the privilege of being his colleague at the National Hospital for over twenty years; years during which I came to have a deep respect for his generosity of mind and his sagacity in all the diverse problems which the life and work of a teaching hospital present to its medical staff.

In a special hospital, such as the National, there is a closer community of intellectual interests than is possible in a general hospital, and one comes to have a deeper appreciation of a colleague's personality and of his gifts, in consequence. From the time when

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Riddoch joined the staff of the hospital my admiration for his clinical wisdom, for his humanist outlook, and for the ready and complete command he always showed over his rich clinical experience, never ceased to grow.

He was singularly good company; his dry humour illumined his conversation, and made those too brief and fleeting contacts, snatched from busy professional lives, that his friends made with him, delightful oases from which they returned, refreshed, to work again. For us his contemporaries, therefore, something precious will have departed from the hospital community in which we have shared, and from that body of recollections which make up so much of the satisfactions of life as we draw towards its later years. To leave such a sense of loss is perhaps the last and truest test of a man's worth. F. M. R. W.

To those many neurologists who benefited from Brigadier Riddoch's guiding hand during the war years, his sudden death must be felt as a great personal loss. As consulting neurologist to the Army he acted as a vital link in the application of the knowledge gained in 1914–18 to the problems presented in the second world war, while his additional consultant appointments to the E.M.S. and Ministry of Pensions enabled him to correlate the military and civilian effort.

The development of centres for the treatment of wounds of the brain, spine, and peripheral nerves proved to be an essential part of the medical war effort, but the part Dr. Riddoch played in insisting on the need for these centres and in guiding their development may have to some extent been forgotten. His tireless round of visits to these special centres was of great value in developing the remarkably high standard of treatment which was achieved, and this has often been acknowledged by the surgeons in charge of these special units. He kept a watching eye on all the neurological and neurosurgical services in this country, and with Sir Hugh Cairns planned the staffing and placing of neurological units overseas. Those of us who played a part in this organisation, however humble, always felt grateful to be under Dr. Riddoch's considerate and friendly direction. In spite of indifferent health during the latter part of the war, his energy and enthusiasm never flagged, but the rush of work and travelling under war-time conditions must have contributed to his illness. After an operation he insisted on returning to duty within a few weeks, and he continued in uniform until the end of the war.

George Riddoch was known throughout the world as one of Britain's leading neurologists, and his self-sacrificing devotion to duty during the war years was an inspiration to us all. W. R. R.

Dr. Riddoch married in 1916 Margaret, daughter of the late John Ledingham of Aberdeen. They had a daughter and two sons, one of whom is a member of the medical profession.

Appointments

CANT, W. H. P., M.D. Lond., M.R.C.P.: physician to outpatients, The Children's Hospital, Birmingham.
HARMER, M. H., M.B. Camb., F.R.C.S.: surgical registrar, The Royal Cancer Hospital (Free), London.
JOHNSTON, J. C., M.B. Belf.: asst. county M.O.H. and M.O.H., Docking, Walsingham, and Wells.
MARTIN, J. J. B., M.D. Edin., F.R.C.P.E., D.P.M.: senior asst. physician, St. James Hospital, Portsmouth.

London County Council Mental Health Service:

KRAUPL, FRITZ, M.D. Prague, D.P.M.: senior registrar, Maudsley Hospital.
MACDONALD, C. K., M.B. Edin., D.P.H.: asst. pathologist, Epsom Pathological Laboratory.
POST, FELIX, M.B. Lond., M.R.C.P., D.P.M.: asst. physician, Maudsley Hospital.
REY, J. H., M.B. Lond.: senior registrar, Maudsley Hospital.

London County Council School Health Service:

GRIMALDI, C. B., B.M. Oxfd: asst. M.O.
NEUSTATTER, W. L., B.SC., M.D. Lond., M.R.C.P.: consultant psychiatrist.

Colonial Service:

BLACKABY, E. J., O.B.E., M.R.C.S., D.T.M. & H.: senior M.O., Uganda.
HILLARY, BRIGID, M.B. N.U.I.: lady M.O., Malaya.
LITTLEJOHN, JOHN, L.R.C.P.E.: M.O., Kenya.
O'DWYER, J. J., M.B. N.U.I.: M.O., Nigeria.
THOMSON, G. M., M.C., M.D. Edin., M.R.C.P., D.P.H.: adviser on venereal disease control, West Indies.

Public Health

Disinfestation by Municipal Authorities

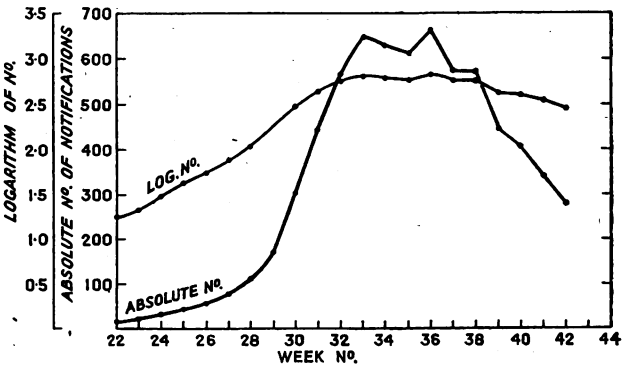
A DISINFESTATION service provided by the Salford health department has proved its value over the last three years. It comprises two men, a motor-van, and spraying and dusting equipment.

The demand has been sufficiently strong for the service to pay its way; nearly a thousand jobs are done each year. The corporation housing department, landlords, and the general public seem nowadays to be more willing to have premises disinfested, and moreover to pay for this; and workers in school and factory canteens are eager to see that the premises in which they work are reasonably fly-free. With new remedies such as D.D.T. and gammexane, and simple methods of application, the cost is low. In Salford typical charges are of the order of 21*s.* for eradication of bugs in a dwelling-house, 5–15*s.* for eradication of cockroaches, and 12*s.* 6*d.* for fly-proofing of a canteen kitchen.

A solution of 3% D.D.T. in kerosene has been found a useful insecticide against the bed-bug and house-fly; one application has proved sufficient for complete eradication of bed-bugs. Running insects appear to be more susceptible to D.D.T. in dust form; but in the case of cockroaches more than one application is often needed. Two treatments at an interval of three months maintain premises reasonably fly-free throughout the summer.

Poliomyelitis and Polioencephalitis

Notifications of poliomyelitis in England and Wales in the week ended Oct. 18 fell to 276, a reduction of about



18% on the figure for the previous week (338). The decline has now been established for six weeks. There was no obvious difference in the decline registered in different parts of the country, but it was perhaps more noticeable in the South than in the Midlands and North.

The Third Quarter

The Registrar-General [1] reports that 216,310 live births were registered in England and Wales in the third quarter of this year—18,727 fewer than in the second quarter. The birth-rate of 20·0 per 1000 population reflects the continued decline in the rate, which, having risen steadily since the end of the war to a peak of 22·8 in the first quarter of this year, began to fall in the second quarter when it was 22·0. It may be compared, however, with an average rate of 15·7 for the September quarters of the five years 1941–45. Stillbirths registered in the quarter numbered 5024, giving a rate of 22·7 per 1000 total births or 0·46 per 1000 population, compared with 26·6 or 0·53 in the September quarter of last year.

There were 97,066 deaths, the death-rate of 9·0 being 0·3 below that of the corresponding period a year ago.

Infectious Disease in England and Wales

WEEK ENDED OCT. 18

Notifications.—Smallpox, 0; scarlet fever, 1352; whooping-cough, 1009; diphtheria, 202; paratyphoid,

1. Registrar-General's Weekly Return of Births, Deaths, and Infectious Diseases for the week ended Oct. 18. H.M. Stationery Office. 6*d.*

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16; typhoid, 7; measles (excluding rubella), 1797; pneumonia (primary or influenzal), 531; cerebrospinal fever, 44; poliomyelitis, 276; polioencephalitis, 12; encephalitis lethargica, 0; dysentery, 46; puerperal pyrexia, 113; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from measles, 2 (0) from diphtheria, 2 (0) from whooping-cough, 60 (2) from diarrhœa and enteritis under two years, and 11 (5) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 222 (corresponding to a rate of 27 per thousand total births), including 25 in London.

Diary of the Week

NOV. 2 TO 8

Monday, 3rd

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
6.15 P.M. Mr. J. Angell James: Acute Rhinitis.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
4.30 P.M. *Epidemiology and State Medicine.* Dr. E. Ashworth Underwood: History of Cholera in Great Britain. Major-General Sir John Taylor: Cholera Control. Mr. P. Bruce-White: Bacteriological and Immunological Aspects of Cholera.
SOCIETY OF APOTHECARIES OF LONDON, Black Friars Lane, E.C.4
5 P.M. Dr. Peter Bishop: Hormone Therapy in Gynæcology.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
2.30 P.M. Miss D. J. Collier: Facial Paralysis.
ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh
8 P.M. Dr. John Gillies: Simpson—a Pioneer of Anæsthesia.

Tuesday, 4th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. F. S. Cooksey: Physical Treatment in Otolaryngology.
SOCIETY OF APOTHECARIES
5 P.M. Prof. E. C. Dodds, F.R.S.: Hormones as Therapeutic Agents Apart from Gynæcology.
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. A. D. Porter: Vitamins in Skin Diseases.

Wednesday, 5th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. Myles Formby: Acute Infections of the Pharynx and Parapharyngeal Space.
ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History of Medicine.* Dr. H. P. Bayon: Karl Marx (1818–83)—His Ailments and Relations with Medicine.
8 P.M. *Surgery.* Sir Max Page: Surgical Records. (Presidential address.)
SOCIETY OF APOTHECARIES
5 P.M. Dr. R. R. Trail: Diagnosis and Treatment of Pulmonary Tuberculosis.

Thursday, 6th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. Janet Vaughan: Anæmia Associated with Trauma and Sepsis. (Bradshaw lecture.)
ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Hugh Davies: X-ray Diagnosis in Otolaryngology.
ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* Dr. C. Worster-Drought: Charcot's Arthropathy. (Presidential address.)
UNIVERSITY OF LONDON
5 P.M. (1, Wimpole Street, W.1.) Mr. E. D. D. Davis: Applied Anatomy and Physiology of the Pharynx and Œsophagus. (Semon lecture.)
SOCIETY OF APOTHECARIES
5 P.M. Dr. James Craigie, F.R.S.: Virus Diseases—Treatment. (Second lecture.)
INSTITUTE OF DERMATOLOGY
5 P.M. Dr. G. B. Mitchell-Heggs: Erythemato-papular and Erythemato-squamous Eruptions.
HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Prof. G. F. Marrian, F.R.S.: Corpus Luteum Hormone.

Friday 7th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. James Crooks: Sinusitis in Childhood.
ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Mr. Donald Watson: Mastoid Infection. (Presidential address.)
2.30 P.M. *Laryngology.* Mr. A. J. M. Wright: Milestones in Laryngology. (Presidential address.) Mr. Ian Robin: Snoring.
5.30 P.M. *Anæsthetics.* Dr. J. H. T. Challis: Teaching of Anæsthesia to Medical Students. (Presidential address.)
NATIONAL HOSPITAL, Queen Square, W.C.1
4.30 P.M. Prof. J. Lhermitte: Relation of Neurology to Psychiatry.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. R. A. Beaver: Anæsthesia for Thoracotomy.

Notes and News

THREE-POINT PLAN FOR NURSING

SPEAKING at Middlesex Hospital, London, on Oct. 24, Mr. Aneurin Bevan, Minister of Health, described the report of the Working Party on the Recruitment and Training of Nurses as the most stimulating and challenging document on nursing yet produced. The report, he said, was concerned with long-term measures, and immediate action must be taken towards: (1) reviewing factors likely to contribute to wastage among nursing recruits; (2) relieving nurses of domestic work; and (3) part-time nursing. The present average rate of wastage of 54% among nursing recruits was, he held, indefensible. The use by some hospitals of nurses for domestic work was unfair to other hospitals faced with the prospect of having to close wards. On some points in the report, such as the duties and conditions of service of the suggested new orderly grade, selection tests for students, and better provision for training sister-tutors, more detailed work was being undertaken before final decisions were made. Mr. Bevan said that over 12,600 nursing staff, including 1740 midwives, had so far responded to the appeal for part-time service. There were now nearly 100,000 full-time and 18,000 part-time domestic workers in hospitals, including nearly 3000 European volunteer workers; this was an increase of some thousands since 1946.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY

THE annual meeting of this society, held in Rheinfelden, Switzerland, on Sept. 10–14, was attended by members representing nine countries. Dr. Barnes Burt (Bath) was elected chairman of council, with Prof. Franistek Lenoch (Prague), Dr. G. D. Kersley (Bath), and Prof. K. Walthard (Geneva) as vice-chairmen. The treasurer is Dr. F. Clayton (Leamington), and the secretary Dr. Donald Wilson (Bath).

Subjects discussed included the neurohumoral effects of irritation of the skin (Professor Staub); the physiology of high altitude (Professor Verzar); spa treatment of the sequelæ of poliomyelitis (Professor Fanconi); the treatment of asthma at an altitude of 5500 ft. (Professor Campell); balneotherapy in the treatment of peripheral vascular disorders (Dr. Wilson and Professor Lenoch); balneotherapy with sulphur water in non-rheumatic diseases (Dr. Nicholson and Professor Buergi); and spa treatment in rehabilitation after accidents and war injuries. The discussion on this last subject opened with a paper by Dr. McClellan, of Saratoga Springs, outlining the scheme evolved by the American army during the war, for the use of spas in the reablement of the injured, and emphasising the importance of continuing the scheme during years of peace. Dr. Barnes Burt gave an account of his experience with injuries during the war, and read a communication from the U.S.S.R. on the treatment of frost-bite. Demonstrations were given at Schinznach Bad and Rheinfelden, and some of the visitors toured spas in the Engadine, finishing at Locarno. Several sessions of the society were held in the various spas, and a demonstration of the treatment of poliomyelitis was given at Regaz. Members had much private hospitality offered to them, both by the Swiss members of the society and by the members of the Swiss Society of Medical Hydrology and Climatology.

This meeting coincided with the 25th anniversary of the I.S.M.H.; and despite the many difficulties it was unanimously agreed that it still plays a useful part in the international recognition of balneotherapy.

HOW EUROPE FEEDS

A SPECIAL issue of *Picture Post* for Nov. 1 describes in pictures and short articles the findings of a team of investigators who have spent three months in studying the food position of Europe as seen in the homes of the people. The main lesson that emerges is the contrasting position in different countries.

Hospital for Diseases of the Skin

War damage to this hospital has now been repaired, and it is once more open for postgraduate teaching. Doctors are welcome as guests at the clinics held from Mondays to Fridays at 2 P.M., and on Tuesdays and Fridays at 5.30 P.M. Further details may be had from the secretary of the hospital, Blackfriars Road, S.E.1.

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University of Oxford

On Oct. 16 the following degrees were conferred:

B.M.—*D. C. Bernstein, W. L. Gordon, Mercy I. Heatley, N. C. Hughes Jones, G. E. Mann, O. M. Wrong.

* In absentia.

University of Cambridge

On Oct. 18 the following degrees were conferred:

M.D.—C. W. A. Searle.

M.B., B.Chir.—* A. P. C. Bacon, * H. B. Barlow, * D. M. Evans, * A. S. Fairbairn, J. L. Harris, * C. F. Hingston, * P. E. Hughesdon, * I. C. K. Mackenzie, * E. T. Roberts, I. B. Smith, * Walter Spector, * M. H. D. Veale, * J. S. W. Whitehead, * R. H. L. Wolfsohn, * A. J. W. Woodroffe.

M.B.—N. C. Lendon.

* By proxy.

Prof. H. R. Dean has been re-elected representative of the university on the General Medical Council for a further five years.

University of London

Mr. Victor Dix has been appointed to the university chair of surgery at the London Hospital.

Mr. Dix received his medical education at the University of Cambridge, the London Hospital, and Berlin, where he worked as voluntary assistant to Prof. A. von Lichtenberg. He qualified in 1923 and took his M.B. two years later, and the following year he obtained both his M.R.C.P. and his F.R.C.S. After holding house-appointments at the London Hospital he became surgical first assistant, later joining the staff as surgeon with charge of out-patients and assistant surgeon to the genito-urinary department. He was also lecturer in surgical pathology at the medical college. In the late war he was in charge of a urological centre in the Middle East, and in 1946 he was appointed consulting surgeon to the South East Asia command. He has published papers on calculus, hydronephrosis, pyelitis, prostatic enlargement, and temporary drainage of the kidney.

Prof. Henry Barcroft has been appointed to the university chair of physiology at St. Thomas's Hospital.

Dr. Barcroft, who is 43 years of age, and is a son of the late Sir Joseph Barcroft, was educated at Marlborough College and King's College, Cambridge, where he obtained a first-class in both parts of the natural sciences tripos. At Cambridge he was awarded the Harold Fry and George Henry Lewis studentships, and at St. Mary's Hospital, London, where he went to complete his medical studies, he held the Harmsworth scholarship. In 1932 he took the Conjoint qualification and in the same year was appointed lecturer in physiology at University College, London. He took his M.B. the following year and his M.D. in 1935, the year in which he was also appointed to the Dunville chair of physiology at Queen's University, Belfast. Professor Barcroft is a member of the North Ireland Regional Hospitals Council. His recent work, undertaken with Prof. O. G. Edholm and others, has been largely concerned with the regulation of blood-flow through muscle (*Lancet* 1944, i, 489; 1946, ii, 513).

Dr. T. D. Day has been appointed to the university readership in pathology at St. Thomas's Hospital.

Dr. Day studied medicine at the University of Cambridge and Charing Cross Hospital, graduating M.B. in 1932. In 1936 he became an assistant pathologist at the Central Histological Laboratory of the L.C.C. and in 1938 he was appointed research assistant to the regius professor of physic in Cambridge. From 1939 to 1945 he was in charge of the laboratory of a general field hospital and since demobilisation he has been lecturer in pathology at St. Thomas's.

Dr. T. Russell Fraser has been appointed to the university readership in medicine tenable at the Postgraduate Medical School of London.

Dr. Fraser graduated M.B. with distinction at Otago in 1932 and he has held a New Zealand University travelling fellowship. In 1935 he was awarded the Hallett prize and three years later a Rockefeller travelling fellowship. He has also worked as a research fellow at Harvard University. In 1940 he was appointed psychiatrist at Mill Hill E.M.S. Hospital, where for the next two years he was in charge of a team investigating for the Ministry of Home Security the psychiatric effects of bombing, and he reported the results in a paper to the Royal Society of Medicine. In 1943 he became investigator in charge of a team for the Industrial Research Board, and in 1946 he joined the staff of the Maudsley Hospital. Since 1946 he has been registrar and lecturer in medicine at the school. He has published papers on insulin therapy and on Simmonds's disease.

Mr. C. J. O. R. Morris, PH.D., F.R.I.C., has been appointed to the university readership in chemical pathology at the London Hospital. Since 1944 he has directed the chemical research of the endocrine unit of the hospital, and since 1945 has been chemist to the medical unit.

Regional Boards' Appointments

Sheffield region: Dr. W. A. Ramsay (superintendent, Crumpsall Hospital, Manchester) has been appointed senior administrative medical officer of the region.

South-west Metropolitan region: For reasons of health Dr. Kenneth Cowan will not after all take up his appointment as senior administrative medical officer of this region. He will continue to serve as M.O.H. for Gloucestershire.

University of Glasgow

Mr. Walter Elliot, M.P., has been elected rector of the university. Mr. Elliot headed the poll with 1022 votes, and Dr. O. H. Mavor (James Bridie), the other medical candidate, was second with 521 votes.

University of Edinburgh

Mr. Norman Dott has been appointed to the new Forbes chair of neurological surgery.

Mr. Dott, who is 50 years of age, was educated at George Heriot's School, Edinburgh, and the University of Edinburgh, where he graduated M.B. in 1919. After holding house-appointments at the Deaconess Hospital, the Royal Infirmary, and the Royal Hospital for Sick Children in Edinburgh, he was awarded the Syme surgical fellowship in 1922. The following year with a Rockefeller fellowship he worked at the Peter Bent Brigham Hospital in Boston as a junior associate in surgery. On his return to Edinburgh he was appointed assistant surgeon to the Deaconess Hospital and to the Chalmers Hospital, later becoming neurological surgeon to the Royal Infirmary and Jordanburn Nerve Hospital. He is also lecturer in neurological surgery in the university. During the late war he was director of the neurological and neurosurgical brain injuries unit at Bangour E.M.S. Hospital, and consultant in neurological surgery to the Army in Scotland. His published work includes papers on the management of head injuries and on surgery of the brain and skull.

University of Aberdeen

Dr. John Craig has been appointed to the new chair of child health in the university.

Dr. Craig was educated at Robert Gordon's College and the University of Aberdeen, where his medical studies were interrupted during the 1914–18 war by his service as a lieutenant in the Royal Garrison Artillery. He graduated M.B. in 1921 with honours and held house-appointments at Aberdeen Royal Infirmary and at the Hospital for Sick Children, Great Ormond Street. In 1922 with a George Thompson fellowship he worked at the Hôpital des Enfants Malades in Paris, and on his return to this country he spent several months in general practice in Keith. In 1924 he was appointed as assistant physician to the Royal Aberdeen Hospital for Sick Children, and the following year he obtained his M.R.C.P.E. and was appointed clinical tutor in the wards of the Aberdeen Royal Infirmary, whose staff he joined in 1932. From 1928 to 1935 he was also assistant in the department of medicine of the university. In 1937 Dr. Craig took up his present appointments of senior physician to the Royal Hospital for Sick Children, university lecturer in diseases of children, and consulting pædiatrician to the Aberdeen Maternity Hospital. His published work includes papers on spinal tumours and on malignant hypertension in childhood, on basophil adenoma of the pituitary, and on the treatment of calcinosis in children. He has also done research work on the incidence of acute rheumatism in Aberdeen and of recurrent bronchitis in children.

Dr. James Walker has been appointed lecturer in midwifery and gynæcology.

Royal College of Physicians of London

On Tuesday and Thursday, Dec. 9 and 11, at 5 P.M., Sir Arthur MacNalty will deliver the FitzPatrick lectures at the college, Pall Mall East, S.W.1. His subject is to be the History of State Medicine in England; in his first lecture he will deal with the medical department of the Local Government Board, and in his second with the foundations of the national health services.

On Oct. 18 the Bisset Hawkins medal was presented to Dr. C. H. Andrewes, F.R.S., for his researches in typhus and in influenza.

Royal College of Surgeons of England

On Thursday, Nov. 13, Sir Cecil Wakeley will deliver the Bradshaw lecture on Vogue and Fashion in Abdominal Surgery. On Friday, Nov. 21, Dr. I. Harvey Flack will give the Thomas Vicary lecture. He is to speak on Lawson Tait. Both lectures will be held at the college, Lincoln's Inn Fields, London, W.C.2, at 5 P.M.

Royal College of Physicians of Ireland

The following officers have been elected: *President*, Dr. Bethel Solomons; *censors*, Dr. Alan Thompson, Dr. D. M. Mitchell, Dr. M. Crowe, Dr. E. A. Keelan; *treasurer*, Dr. G. Bewley: *registrar*, Dr. T. P. C. Kirkpatrick. The president nominated Dr. Keelan as vice-president.

Royal Sanitary Institute

On Thursday, Nov. 6, at 10 A.M., in the City Hall, Belfast, Dr. Samuel Barron, Dr. W. G. Swann, and Dr. G. F. W. Tinsdale will open a discussion on the Control of the Manufacture and Sale of Ice-cream. On Saturday, Nov. 22, at 10.15 A.M., at the Town Hall, Dewsbury, Dr. E. D. Irvine will speak on the Local Authority and the Promotion of Health.

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National Hospital, Queen Square

Prof. J. Lhermitte will deliver a lecture at the hospital, on Friday, Nov. 7, at 4.30 P.M., on the Relation of Neurology to Psychiatry. He will speak in English.

Dr. Jessie Macgregor Prize

This triennial prize, of the value of £75, has been awarded for the present period to Dr. Sheila Sherlock, for her work on liver, purpura, and malnutrition in the Ruhr.

New Zealand Appointment

Dr. F. Bielschowsky, who has been working in the department of pathology of the University of Sheffield under the British Empire Cancer Campaign, has been appointed director of cancer research for New Zealand.

Faculty of Homœopathy

A meeting of the faculty will be held at the London Homœopathic Hospital, Great Ormond Street, W.C.1, on Thursday, Nov. 6, at 5 P.M., when Dr. Andrew Kellner will speak on Artificial Hazards in Prescribing.

Factory Instals Mass-radiography Unit

A mass-radiography service, said to be the first to be installed by a factory, has been started by the Ford Motor Company at Dagenham. Examinations will be free and voluntary, and reports are to be confidential.

Lecture on Contraception

On Thursday, Nov. 6, at 2.30 P.M., at the Mothers' Clinics, 108, Whitfield Street, London, W.1, Mrs. Marie Stopes, D.SC., will give a lecture on contraception, and Dr. M. B. Bayly will afterwards give a demonstration. Admission by ticket only to be obtained in advance from the secretary of the clinics.

South-West Metropolitan Regional Board

At a meeting of psychiatrists of this region, it was resolved to form a psychiatric advisory group. The group will take the initiative in forwarding to the board proposals for the development of the mental health services in the region, and be available for consultation with the subcommittee on matters of psychiatric importance. Membership of the group is open to all psychiatrists in the region, and all who are interested are asked to communicate with Dr. T. P. Rees, of Warlingham Park Hospital, Warlingham, Surrey.

International Course for the Emergencies of Medicine and Surgery

This course, which met in Lisbon and Oporto from Oct. 1 to 15, was organised by the civil hospitals in Lisbon under the ægis of the Portuguese ministry of the interior. The British representatives who spoke were Sir Archibald McIndoe (Maxillofacial Injuries and Burns); Mr. H. A. Brittain (the Acutely Prolapsed Intervertebral Disc and Compound Fractures of the Femur); Mr. R. G. Pulvertaft (Tendon Injuries in the Hand); and Mr. H. Osmond Clarke (Compound Fractures and Rehabilitation).

Glasgow and West of Scotland Blood Transfusion Service

A symposium on blood-transfusion will be held by this service in the Royal Technical College, George Street, Glasgow, C.1, on Friday, Nov. 14, at 2.30 P.M. Discussions have been arranged on the Care of the Blood Bank (openers: Mr. G. R. Milne, Prof. J. P. Todd, PH.D.); Transfusion in Practice (Dr. J. Bruce Dewar, Dr. John Wallace); and the Importance of the Rhesus Factor (Prof. D. F. Cappell, Dr. A. W. Abramson). Further information may be had from the director of the service, 15, North Portland Street, Glasgow, C.1.

School Meals in London

The education committee of the L.C.C. has found itself unable to meet the growing demand for school dinners. It has therefore decided to experiment with a scheme of priorities under which some children will be given in rotation on one or two days each week a meal consisting of sandwiches and a sweet course; on the remaining days they will have the normal school dinner. The Ministry of Education have agreed to recognise these sandwich lunches as school meals for grant purposes; and an additional allocation of bread units has been secured.

British Psycho-Analytical Society

On Wednesday, Nov. 19, at 8 P.M., Prof. C. H. Waddington, F.R.S., will deliver the Ernest Jones lecture at 1, Wimpole Street, London, W.1. His subject is to be Science and Belief.

New York Academy of Medicine

The 1947–48 series of the academy's lectures to the laity includes addresses by Dr. G. R. Hargreaves on the Psychology of Leadership in War and Peace (Nov. 19); and by Sir Raphael Cilento, M.D., on Food and Civilisation (Dec. 17). Further information about the series may be had from Dr. Iago Galdston, 2, East 103 Street, New York, 29, N.Y.

Return to Practice

The Central Medical War Committee announces that Mr. A. J. HERIOT, F.R.C.S., has resumed civilian practice at 152, Harley Street, London, W.1 (Welbeck 9030).

Dr. W. W. Mushin, director of the department of Anæsthetics at the Royal Infirmary, Cardiff, attended the Congress of Anæsthesiology in Buenos Aires between Oct. 20 and 26, at the invitation of the Argentine Association of Anæsthesiology and under arrangements made by the British Council.

Dr. H. Graham Hodgson, director of the diagnostic X-ray department at Middlesex Hospital, London, is leaving for a three weeks' lecture tour in Turkey on behalf of the council.

CORRIGENDA. *Surgery of Hyperthyroidism.*—Our leading article of Oct. 4 said that in 1921 Dr. Frank H. Lahey recommended complete thyroidectomy in cases of hyperthyroidism with advanced cardiac failure. We understand that in fact he never favoured complete thyroidectomy but recommended the subtotal operation.

Whaling Today.—In last week's account (p. 639) of a discussion by the Universities Federation for Animal Welfare on methods of killing whales, Sir Robert Robinson, P.R.S., was incorrectly reported as having spoken: the speaker was Sir Robert Robertson, F.R.S.

Births, Marriages, and Deaths

BIRTHS

BARWELL.—On Oct. 22, the wife of Dr. A. H. Barwell—a daughter.
BROWN.—On Oct. 22, at Colac, Victoria, Australia, the wife of Dr. A. Graham Brown—a son.
DANIEL.—On Oct. 13, at Oxford, the wife of Dr. P. M. Daniel—a son.
FRANCIS.—On Oct. 15, the wife of Dr. R. S. Francis—a daughter.
HASLER.—On Oct. 21, in London, the wife of Dr. J. K. Hasler—a daughter.
HENSON.—On Oct. 26, in London, the wife of Dr. R. A. Henson—a daughter.
KENNEDY.—On Oct. 22, the wife of Dr. David Kennedy—a son.
MALLETT.—On Oct. 16, at Stourfield, Wimborne, Dorset, the wife of Dr. A. E. de la T. Mallett—a daughter.
RICHARDS.—On Oct. 21, in London, the wife of Major H. J. A. Richards, R.A.M.C.—a daughter.
ROSE.—On Oct. 20, at Blackburn, the wife of Dr. D. J. Rose—a daughter.
SHEPHERD.—On Oct. 17, at Birmingham, the wife of Dr. H. M. D. Shepherd—a son.
WALSH.—On Oct. 21, in London, the wife of Dr. R. Crosbie Walsh—a son.

MARRIAGES

MOON—LANG.—On Oct. 18, at Reigate, Anthony James Moon, M.B., to Jean Voase Lang, M.B.
ODBERT—STOVIN-BRADFORD.—On Oct. 25, in London, Ernest Sidney Odbert, M.B., to Daisy Stovin-Bradford.

DEATHS

CROUCH.—On Oct. 19, in London, Harold Armstrong Crouch, O.B.E., M.C., M.A. Camb., M.R.C.S., D.P.H., lieut.-colonel R.A.M.C.
FAWCUS.—On Oct. 24, Sir Harold Fawcus, K.C.B., C.M.G., D.S.O., D.C.L., M.B. Durh., D.P.H., aged 71.
FOSKETT.—On Oct. 4, at Karamea, New Zealand, Walter Foskett, M.C., M.D. Durh., squadron-leader, R.A.F.V.R., aged 57.
GORDON.—On Oct. 25, George Gordon, M.B. Glasg.
HALLIDIE.—On Oct. 19, Andrew Hallidie Smith Hallidie, M.A., M.B. Camb., F.R.C.S., aged 85.
LE FEUVRE.—On Oct. 16, at Kenilworth, Cape Town, William Philip Le Feuvre, M.R.C.S., aged 88.
MACCORMICK.—On Oct. 25, at St. Brelade, Jersey, Sir Alexander MacCormick, K.C.M.G., K.B., M.D. Edin., F.R.C.S.E., aged 91.
PHILLIPS.—On Oct. 21, at Danby, North Yorks, Wilfrid Westwood Phillips, M.B. Edin.
PINHORN.—On Oct. 22, at Tunbridge Wells, Richard Pinhorn, M.R.C.S., aged 92.
RADCLIFFE.—On Oct. 19, Frank Radcliffe, M.D. Manc., aged 75.
RIDDOCH.—On Oct. 24, in London, George Riddoch, M.D. Aberd., F.R.C.P., aged 58.

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DES MOINES, IOWA

PHYSIQUE AND GROWTH OF SCHOOLBOYS

G. E. FRIEND
M.A. Oxfd, M.R.C.S.
LATE MEDICAL OFFICER, CHRIST'S HOSPITAL

E. R. BRANSBY
Ph.D. Lond.
SOCIAL ECONOMIST, MINISTRY OF HEALTH

AN investigation was started in 1936 to obtain information on the physique of adolescent schoolboys belonging to families of differing economic standing, and on the growth of boys attending boarding-schools and day schools during school terms and holidays. There was then no published information, apart from that of Friend (1935), on their growth and practically none on their physique. Subsequent studies have been published by Allan (1937, 1939) and Widdowson and McCance (1944) on growth in term and holiday, and by Orr (1936) and Norman (1939) on physique according to economic status.

During the seven school terms from September, 1936, to December, 1938, we collected anthropometric data of boys aged 11–18 years attending thirteen public boarding-schools and six day secondary schools. The boys were to be weighed at the beginning, middle, and end of each school term and measured in height at the beginning and end of each term, and in chest girth each December. Of the nineteen schools, thirteen followed this programme, though all of them did not do so for the full seven terms. The other six schools varied from the programme in some particular, such as omitting the mid-term weighing. The boys were weighed and measured wearing shorts only; directions were issued to the physical-training instructors to ensure, so far as possible, a uniform measuring of the chest in each school. The average of chest girths at nipple level during expansion and contraction was taken as the chest girth, and the difference of these two measurements as the amount of chest expansion.

The average weight, height, and chest girth and expansion of boys in yearly age-groups in each school were calculated from the measurements of the boys of the respective ages taken during the whole period of the study. Thus, in schools where the weighings were done thrice a term the averages were based on twenty-one sets of figures—i.e., three sets a term, for each of seven terms; for schools where the mid-term weighings were not taken the averages were based on fourteen sets of figures. The average ages of the yearly age-groups were also calculated, and from these data the average heights, weights, and chest girth and expansion at exactly yearly intervals were calculated by interpolation.

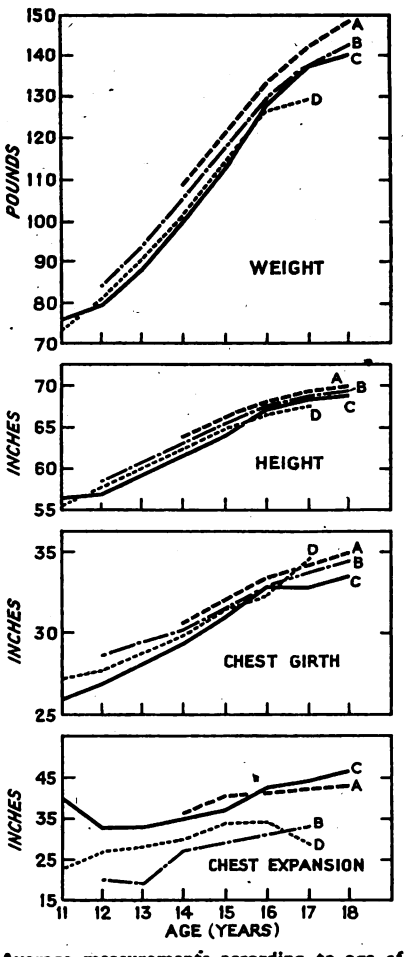
The thirteen boarding-schools were then divided into three groups, A, B, and C, according to the school fees and status, as a probable reflection of the economic standing of the parents of the boys attending the schools. This classification is not the same as that based on the cial standing of the school. It is appreciated that at ·st some of the better-known public schools are attended by scholars of different economic and social standing, but it was thought that such a division would be adequate for grouping the schools according to the economic standing of the parents. Two schools were classed as group A, of highest economic standing; seven schools as group B, of intermediate economic standing; and four schools, including Christ's Hospital, as group C, of lowest economic standing. The day secondary schools were broadly of the same type, and no division according to economic status was possible. For each of the four groups—i.e., the three groups of boarding-schools and the day schools—averages for the different sets of anthropometric data were calculated from the data of the schools comprising the groups.

Among other aims we tried to find out whether the fluctuations in growth-rates in different parts of the schools terms and holidays were the same in boarding-schools as in day schools, and whether there were differences between individual boarding-schools and day schools. For those schools in which the boys were weighed at the beginning, middle, and end of each term a calculation was made of the number of boys who lost, gained, or remained stationary in weight in the first and second halves of each term and in the holiday, for each of the seven terms. From a scrutiny of the resulting figures it was decided that the data of boys of all ages and for the same parts of the different years could be combined to give a picture of the results for the individual schools as a whole. Few of the boys remained stationary in weight in the various parts of the year; so they were combined with those who gained weight, and it is the percentages for these two groups combined which are given in tables III and IV.

Two of the boarding-schools had some day boys, and in the analyses comparing growth during term and holiday the data of the day boys and boarders of these two schools were considered separately. One of the day schools had a few boarders, not sufficient, however, to warrant separate analyses for the day boys and boarders.

RESULTS

Physique According to Economic Status.—Table I and the accompanying figure show the average anthropometric data according to age for the four groups of schools and the number of boys on which the averages were based. The number of measurements on which the averages were based was many times the number of boys, because of the frequency with which the boys were weighed and measured.



Average measurements according to age of boys and type of school: A, boarding-schools of highest economic standing; B, boarding-schools of intermediate economic standing; C, boarding-schools of lowest economic standing; D, day schools.

Weight.—For boys aged 14–18 years the weights in group A exceeded those in group B, age for age, by 2·7–6·4 lb., the difference tending to become bigger at the older ages. The weight of group-B boys aged 12–18 years exceeded that of group-C boys of the same age by 1·2–6·1 lb., except that at 17 years the group-C boys were very slightly heavier. Throughout the age-range 13–18 years the differences between the group-C and day-school boys were not consistent, and taken as a whole there was probably no difference between these two groups. On the average the weight of the group-A boys exceeded that of

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TABLE I—AVERAGE WEIGHT, HEIGHT, CHEST GIRTH, AND EXPANSION ACCORDING TO AGE AND TYPE OF SCHOOL

Group	11 years					12 years					13 years					14 years				
	No.	Wt. (lb.)	Ht. (in.)	Chest Girth (in.)	Chest Exp. (in.)	No.	Wt. (lb.)	Ht. (in.)	Chest Girth (in.)	Chest Exp. (in.)	No.	Wt. (lb.)	Ht. (in.)	Chest Girth (in.)	Chest Exp. (in.)	No.	Wt. (lb.)	Ht. (in.)	Chest Girth (in.)	Chest Exp. (in.)
Boarding A ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	134	107·9	63·7	30·6	3·6
B ..	..	..	..	..	..	89	83·5	58·5	28·7	2·0	139	93·3	60·7	29·5	1·9	488	105·2	63·3	30·1	2·7
C ..	284	75·7	56·2	25·9	4·0	563	79·3	56·8	26·9	3·3	888	88·2	59·2	28·2	3·3	1537	99·1	61·6	29·5	3·5
Day secondary	187	73·2	55·6	27·2	2·3	693	80·3	57·7	27·7	2·7	857	90·2	60·1	28·8	2·8	895	100·5	62·4	30·1	3·0

	15 years					16 years					17 years					18 years				
Boarding A ..	392	120·5	65·9	31·9	4·0	448	133·0	67·9	33·3	4·1	419	141·6	69·2	34·2	4·2	351	147·9	69·7	34·9	4·3
B ..	1108	117·1	65·6	31·4	2·9	1168	128·5	67·6	32·8	3·1	1106	136·9	68·8	33·8	3·3	747	141·5	69·4	34·4	3·2
C ..	1573	111·8	64·1	31·1	3·7	544	127·3	67·1	32·8	4·2	412	137·1	68·7	32·8	4·4	152	140·0	68·9	33·5	4·6
Day secondary	894	113·6	64·9	31·4	3·4	715	126·1	66·9	32·4	3·4	92	129·1	67·7	34·4	2·9	..	..	..	..	..

the group-B boys by about 3% and that of the group-C and day-school boys by 8%; the weight of the group-B boys exceeded that of the group-C and day-school boys by about 5%.

Height.—For the age-range 14–18 years, the group-A boys were slightly taller, by about $^1/_4$–$^1/_2$ in., than the corresponding group-B boys. The group-B boys aged 12–15 years were taller than the corresponding group-C boys by about $1^1/_2$ in., and those aged 16–18 years by about $^1/_2$ in. As in the case of weight, the differences between group-C and day-school boys were not consistent, and on the whole there was probably no difference between the two groups. The height in group A exceeded that in group B by less than 1%; that in groups A and B exceeded that in group-C and day-school boys by about 3%.

Chest Girth and Expansion.—As a whole, the chest girth in group A was slightly greater than that in group B, but there was no difference between group-B and day-school boys. The chest girth of these two groups exceeded that in group C, especially at the younger ages.

For chest expansion, groups A and C were practically the same, as were group B and day boys, but the two former exceeded the two latter by about 1–$1^1/_2$ in., or about a third. There were considerable differences in chest expansion in the individual schools. Christ's Hospital, a group-C school, had a consistently greater expansion than the other schools and was followed by a group-A school. In Christ's Hospital a specially devised system of "free standing" physical training in the open air is followed; in two other schools with "free standing" physical training, but not in the open air, the chest expansions were not above the average for the schools as a whole. The chest expansion in Christ's Hospital was more than twice that of lowest expansion—in a group-B school.

TABLE II—NUMBER OF BOYS PROVIDING DATA ON GROWTH DURING TERMS AND HOLIDAYS

No. of school	Group and type	Summer holidays	Autumn term 1st half	Autumn term 2nd half	Christmas holidays	Spring term 1st half	Spring term 2nd half	Easter holidays	Summer term 1st half	Summer term 2nd half
1	B Bdg	396	661	651	429	401	419	432	417	415
	B Day	59	92	82	59	56	54	62	51	64
2	B Bdg	..	207	212	342	191	363	354	378	378
3	B Bdg	399	672	651	429	430	407	388	374	364
4	B Bdg	480	927	940	580	555	508	537	578	575
5	B Bdg	..	44	36	36	29	36	35	40	41
	B Day	..	332	312	319	306	343	333	323	326
6	C Bdg	126	143	142	73	57	62	58	68	73
7	C Bdg	..	96	97	77	75	73	75	76	81
8	C Bdg	1475	2462	2439	1575	1623	1612	1609	1586	1603
9	C Bdg	1362	2202	2167	1311	1420	1342	1361	1421	1423
10	Day	62	74	77	75	82	79	..	..	..
11	Day	..	302	276	275	282	..	..	..	..
12	Day	..	..	470	487	470	462	467	451	414
13	Day	203	239	460	..	..	..	..	..	..
14	Day	..	964	901	952	882	914	434	387	..
15	Day	582	1091	1044	639	648	633	663	666	663

Growth During Term and Holiday.—Table II shows the number of boys in each school in the first and second halves of each term and in each holiday on which the analyses were based, and table III shows the percentage of boys in each school who gained weight during each of these periods.

Table IV shows the percentage of boarders and day-boys gaining weight in all the schools. During each holiday, except perhaps Easter, about the same percentage of boarders and day boys gained weight. The percentages gaining weight in the first half of the term were slightly greater for the day boys than for the boarders by 3%, 9%, and 6% for the autumn, spring, and summer terms respectively, but for the second halves of all three terms the differences increased to 15–18%. An interesting point is that, whereas there was little difference between the percentages for the second halves of the three terms either for day boys or for boarders, the boarders showed a fall of 6% between the first half of the autumn term and the first half of the spring term, and a further fall of 14% in the first half of the summer term, and the day boys gave a difference of 17% between the first half of the summer term and the first halves of the other two terms.

The differences between the day schools and boarding-schools shown in table IV can be explained by the data for the individual schools in table III. For both the first and second halves of each term the lowest percentages occurred almost invariably among the boarders and the highest percentages among the day boys. The data for group A were not sufficiently complete to be included in table III, but there seems to be no consistent difference between group B and group C. There are considerable differences between individual day schools and individual boarding-schools, and there is also a suggestion of consistency of pattern for certain schools. Thus no. 2 in table III, a group-B boarding-school, has the low figures of 44% and 33% for the first halves of the spring and summer terms, and 21% and 26% for the second halves of the autumn and spring terms. No. 8

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in table III, a group-C boarding-school, has the high figures of 94%, 87%, and 83% for the holidays, and the low figures of 62%, 46%, and 32% for the first halves of the terms. Another group-C school, no. 6 in table III, has the high figures of 73%, 86%, and 74% for the first halves of the terms. This consistency was noted for a single school by Allan (1937). Taken as a whole, the data for the boarders varied considerably from school to school, and to a greater extent than those of the day boys. Thus, for the day boys, the numbers of those who gained weight in the various schools varied from 51% to 75% in the second half of the autumn term, from 50% to 80% in the second half of the spring term, and from 50% to 71% in the second half of the summer term, compared with 21–73%, 33–62%, and 21–66% for the boarding-schools.

For schools 1 and 5 in table III data are available both for boarders and day boys who gained weight in the first and second halves of the terms and the holidays. The major difference between these two groups of boys in each school was that one lived in the school and the other at home. Hence there may have been differences between the groups not only in diet and sleeping conditions but also in such matters as the amount of exercise

TABLE III—PERCENTAGE OF BOYS GAINING WEIGHT IN THE HOLIDAYS AND FIRST AND SECOND HALVES OF EACH TERM

No. of school	Group and type	Summer holidays	Autumn term		Christmas holidays	Spring term		Easter holidays	Summer term	
			1st half	2nd half		1st half	2nd half		1st half	2nd half
1	B Bdg	77	76	50	63	74	61	74	55	57
	B Day	83	74	54	80	55	70	76	35	67
2	B Bdg	..	72	21	75	44	53	77	33	26
3	B Bdg	64	73	51	66	68	59	79	59	44
4	B Bdg	79	75	44	65	73	47	66	59	41
5	B Bdg	..	68	67	69	79	44	80	48	41
	B Day	..	82	65	67	79	50	63	59	61
6	C Bdg	86	73	73	67	86	37	74	74	66
7	C Bdg	..	68	36	78	65	33	79	51	21
8	C Bdg	94	62	42	87	46	58	83	32	51
9	C Bdg	83	81	40	81	62	62	78	57	53
10	Day	79	85	51	67	83	61	..	..	..
11	Day	..	80	75	79	82	..	..	..	..
12	Day	..	..	65	75	78	80	71	61	50
13	Day	82	52	58	..	..	..	..	..	..
14	Day	..	74	70	72	78	69	81	71	..
15	Day	83	77	58	81	73	61	55	62	71

after school hours. The number of day boys in school 1 and of boarders in school 5 was small, but a comparison can be attempted. The most marked feature is that in the second half of each term for each school, except in the autumn term for no. 5, the percentage of boys gaining weight was greater by 6–20% for the day boys compared with the boarders. In school 1 there was a tendency for the percentages gaining weight in the first half of the term to be more for the boarders than for the day boys, but there was the reverse tendency for school 5.

DISCUSSION

Norman (1939) found that a group of public-school boys aged 14–18 years, compared with a group of secondary-school boys in Durham, an area selected as specially affected by a severe economic depression and unemployment, was about 30 lb. heavier and 3 in. taller, and had a lumbar pull 30 lb. greater. Cathcart et al. (1935) found that employed male adolescents were both taller and heavier than unemployed male adolescents, and that both groups were shorter and lighter than university students of corresponding ages. Orr (1936) showed that boys aged 13–18 years attending one public school were about 2 in. taller than Christ's Hospital boys, and that the latter were about 3 in. taller than the employed males of Cathcart et al. (1935).

The results of the above studies were obtained mainly by weighing and measuring the boys once only and are

TABLE IV—PERCENTAGE OF BOYS GAINING WEIGHT

—	Summer holidays	Autumn term		Christmas holiday	Spring term		Easter holiday	Summer term	
		1st half	2nd half		1st half	2nd half		1st half	2nd half
Boarders ..	81	72	47	72	66	50	77	52	44
Day boys ..	82	75	62	74	75	65	69	58	62

thus subject to variation according to the time of year at which the studies were made. Our results, based on data from nineteen schools and collected several times a year for two or three years, confirm that there are differences in the physique of adolescents according to economic class, though the differences were not so substantial as those found by Orr (1936) and Norman (1939). The public-school boys of both Orr and Norman were of better physique than our group-A public-school boys; the same school provided the data to both those workers, and that school would have been classed in group A in our study. This tends to confirm the superiority in physique of group A over that of group B. On the other hand, the physique of Norman's secondary-school boys was less than that of our day-school boys, perhaps because Norman's boys lived in Durham, a depressed area, whereas ours were drawn from six different localities. Further, there may be regional differences in physique which, for small samples, may exaggerate or diminish social class differences.

We did not collect any data about the physique of employed or unemployed adolescents. However, the physique of each of our groups was better than that of employed and unemployed adolescents in 1929–32 (Cathcart et al. 1935), and of employed adolescents in 1943, as the following unpublished data (table v) collected by the Surveys Branch of the Ministry of Food show, when compared with the corresponding figures in table I. The adolescents in the Ministry of Food's body-weight survey were weighed and measured in indoor clothes and footwear, and the average heights and weights at the various ages must be reduced to enable a comparison to be made with our boys.

An interesting feature of the present study was the difference in physique between the groups of boarding-schools. The fees for all the boarding-schools, except Christ's Hospital and one other school in group C, ranged from about £100 to £250 a year. The boys must therefore have come from homes of good economic standing with good environmental conditions, such as food,

TABLE V—AVERAGE HEIGHTS AND WEIGHTS OF EMPLOYED ADOLESCENT MALES IN 1943: DATA COLLECTED IN THE MINISTRY OF FOOD'S BODY-WEIGHT SURVEY

Age (yr.)	Number	Av. height (in.)	Av. weight (lb.)
15	806	63·2	110·5
16	1310	65·4	121·2
17	1560	66·9	129·6
18	1240	67·3	134·4

The averages are based on data collected in April, July, and October, 1943. All measurements were taken in clothes and footwear.

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housing, clothing, and heating. A possible explanation of this difference in physique is that a genetic factor was responsible, in that boys of genetically superior physique went to group-A schools. It might well be, for example, that a school with a good sports record would attract boys of good physique. Knowledge of the schools in groups A and B, however, suggests that this was probably not the cause. Bearing on this, Jacob (1938) found that the physique of girls attending St. Paul's Girls' School, Hammersmith, where the social class level remained stationary, improved between 1907 and 1937. It may therefore be that, even among those groups of the population for whom environmental conditions are generally considered satisfactory, there is still room for improvement with subsequent improvement in physique. There is in fact no evidence that the full potential physique of the group-A boys was being achieved, because there was no higher standard with which they could be compared.

There seems, however, to be no doubt that the great bulk of the adolescent population is not growing to its full potential. If proper growth is an indication that a child is in good health and consequently better able to resist illnesses of different kinds—a hypothesis for which there is little direct but a good deal of indirect support—it is interesting to speculate to what limits illness-rates among adolescents would be reduced if the environmental conditions were such as to enable the full potential physique to be achieved.

Three studies have been reported on the variations in growth-rates of boys during school terms and school holidays. Allan (1937, 1939), from data of about 1000 boys attending two secondary schools in Leeds in 1937–38 and from data from a small public school of 60–90 boys in the South of England during 1923–32, found a sudden decline in weight in the final month of each term. Widdowson and McCance (1944) found that in two well-known boys' public schools growth in height and weight was much more in the holidays than in the terms, but that in another public school growth was about the same in the terms as in the holidays. Allan, and Widdowson and McCance suggest that the poor growth during the terms was the reflexion of unsatisfactory environmental conditions in relation to the boys' needs. Our results lead to the conclusion that some factors of boarding-school life were responsible both for the differences between the boarding-schools and day schools and between the individual boarding-schools. In the war-time studies on growth by the Ministries of Education and Health (Bransby 1946) it was found that children living in residential camp schools did not grow so well as those living at home.

Data from another well-known boys' boarding-school not included in the present study have some bearing on the differences in growth during term and holidays. In 1934 Dr. H. E. Magee (personal communication), in a week's dietary survey in this school, found that a good diet with a great deal of variety was provided, including ten different varieties of meat, four kinds of fish, fifteen kinds of vegetable, and nine kinds of fruit. The boys could have as much as they liked of most foods and also had access to a tuck-shop. The average consumption of milk was about $^3/_4$ pint a day and of eggs just less than one a day. The diet provided 3300 calories, 106 g. of protein, 1 g. of calcium, 1·6 g. of phosphorus, and 21 mg. of iron per boy per day. No calculation was made of the vitamin content of the diet; but, from the amounts of foods consumed, it was likely to be considerable. Judged by the League of Nations' standard of requirements the diet was excellent. Between 1934 and 1939 the same kind of diet was provided under expert supervision.

Two other matters relating to environmental conditions need to be mentioned. First, in the summer term of 1937 there was an influenza epidemic affecting about three-quarters of the boarders. It began mildly but became severe, and many of the boys were reinfected. Second, in the Michaelmas term of 1936 there were changes in sports training involving greater physical strain than in previous years.

TABLE VI—AVERAGE GAINS IN WEIGHT (LB.) PER MONTH IN TERMS AND HOLIDAYS IN ONE BOARDING-SCHOOL ACCORDING TO AGE

Age-group	Autumn		Spring		Summer		Yearly increase
	Term	Holidays	Term	Holidays	Term	Holidays	
13–14 yr.:							
1934–35	0·28	0·70	0·17	0·44	−0·06	0·55	13·29
1935–36	0·18	0·42	0·24	0·40	0·0	0·41	11·35
1936–37	0·10	0·65	0·17	0·58	−0·07	0·63	12·13
1937–38	−0·03	1·17	−0·02	0·64	0·07	0·63	13·54
14–15 yr.:							
1934–35	0·21	0·99	0·14	0·79	−0·16	0·67	14·37
1935–36	0·22	0·63	0·23	0·66	−0·03	0·49	13·86
1936–37	0·10	0·75	0·24	0·53	−0·02	0·73	14·57
1937–38	0·0	0·99	−0·01	1·10	0·08	0·43	12·60
15–16 yr.:							
1934–35	0·14	1·02	0·11	0·60	−0·16	0·53	11·49
1935–36	0·09	0·72	0·15	0·79	−0·18	0·52	10·58
1936–37	−0·06	0·69	0·17	0·52	−0·10	0·51	7·96
1937–38	−0·01	0·96	0·14	0·77	0·09	0·25	11·56
16–17 yr.:							
1934–35	0·13	0·83	0·09	0·67	−0·27	0·55	9·38
1935–36	0·13	0·64	0·20	0·47	−0·13	0·32	9·17
1936–37	−0·06	0·63	0·08	0·61	−0·17	0·56	7·44
1937–38	−0·04	0·74	0·0	0·59	0·04	0·18	6·91
17–18 yr.:							
1934–35	0·04	1·19	−0·07	0·64	−0·33	0·46	6·33
1935–36	0·03	0·38	0·18	0·59	−0·29	0·22	4·36
1936–37	0·05	0·52	0·21	0·15	−0·13	0·06	3·39
1937–38	0·07	0·96	−0·14	0·81	−0·08	0·26	5·75

Table VI shows the monthly growth-rate in weight during school terms and holidays for 1934–38, in yearly age-groups. The growth in the holidays was consistently better than that in the term, this being particularly conspicuous for the summer term and holidays. For boys of all ages it was customary, on the average, to lose weight during the summer term. There were also considerable differences in the growth pattern from year to year. Thus, for all age-groups, growth in the Michaelmas terms of 1934 and 1935 was considerably greater than that in the Michaelmas terms of 1936 and 1937. This may have been due, to some extent, to the greater physical strain arising from the modified sports training, a suggestion substantiated to some extent by the data for the Lent term of the same years. The influenza epidemic in the summer term of 1937 does not appear to have reduced the average gain in weight in that term compared with the same term in other years. This may have been due to a cessation of cricket, swimming, and other activities during the period of convalescence. For boys aged 15–18 years the annual gains in weight varied considerably from year to year. Thus, for boys aged 15, 16, and 17 years the gains in 1934–35 exceeded those in 1936–37 by 45%, 21%, and 87% respectively.

The interesting point arising from these data is that the considerable losses in weight took place in the school term despite the fact that the boys were well fed. Mumford (1927) remarks on the effect of physical and mental strain on the development of children. In 1916–17 the ordinary school physical instruction was continued in Manchester Grammar School, as was the routine class work of preparing for higher examinations. The faded appearance of the members of the Officers' Training Corps was noticed when the boys returned from the drill ground at the end of the afternoon, and inquiries showed that the weight and measurements of the cadet group had fallen below those of the non-cadet group. Friend (unpublished), from data collected over some years at

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Christ's Hospital, found that boys taking examinations or doing scholarship work or other extra school activities lost more weight in the term than the average loss for the respective ages.

The significance, from the health point of view, of the fluctuations in the rate of growth during the term and holiday has been discussed by Friend (1935), who states that "my experience is that, provided a boy keeps his normal rate of increase in weight at the beginning of each school term, there is no need to worry about loss of weight during the term, provided also that the loss did not go above the average loss of the school on the whole. In the very few cases where a boy weighs less at the beginning of one term than he did at the beginning of the preceding term there is obviously cause for investigation." It would, however, be valuable to obtain health records and data on environmental factors such as diet, severity of exercise, and strain due to preparation for examinations in schools with different patterns of growth to determine the relationship between them.

SUMMARY

Data on the physique and growth during school terms and holidays of boys attending thirteen public boarding-schools and six day secondary schools were obtained in the period September, 1936, to December, 1938. The boarding-schools were classed according to economic standing: A, highest; B, intermediate; and C, lowest.

The average height and weight of boys attending day schools and group-C boarding-schools were about the same, but these were greater in group B, and still greater in group A. In chest girth, group A were greatest, followed by group B and day schools and then by group C. In chest expansion, group A and group C exceeded group B and day schools.

There were differences between the pattern of term and holiday growth between boarders and day boys, the most marked difference being that a greater percentage of boarders than of day boys did not gain weight in the second half of each school term. There were greater differences between individual boarding-schools than between individual day schools.

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"... Gastrectomy is quite frankly a physiological crime, ... If the first defences of normal man are lacking—teeth, common sense and a good wife—the food may travel down the œsophagus and through the curtailed stomach in a condition quite unfit for further digestion. But while gastrectomy is an impertinence, it is at the present time the most satisfactory cure for persistent peptic ulceration and is able to restore a wasted and miserable patient to health and happiness."—Sir HENEAGE OGILVIE, *Aust. N.Z. J. Surg.* July, 1947.

THE PAROXYSMAL TACHYCARDIAS*

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(*Concluded from p. 647*)

Paroxysmal Ventricular Tachycardia

Ventricular tachycardia could be suspected on polygraphic curves (Mackenzie 1908), but its decisive diagnosis had to wait for electrocardiographic proof by Lewis (1909, short attacks with numerous extrasystoles; 1911, longer more ordinary attacks). In both of these forms of attack the auricular activity was undisturbed and easy to identify, but Hart (1912–13) recorded an attack where it was disturbed and there was retrograde condition with 2 : 1 block.

Gallavardin (1920, 1921, 1922) distinguished two varieties: the commonest occurring in seriously diseased hearts—the pre-fibrillatory type—and a less common one of no serious significance where the attacks were mostly short but very frequent with frequent ventricular extrasystoles also.

A sixth of my cases with cardiograms of the attack had ventricular tachycardia, and Hume (1930) gave the proportion as a fifth. But most of the 100 without cardiograms probably had supraventricular tachycardia; hence not more than 1 paroxysm in 15 is ventricular. Cooke and White (1943) collected their 27 cases from 25,000 patients with real or suspected heart disease, and at the same time used 750 patients with auricular tachycardia for discussing the prognosis. As four-fifths of all ventricular paroxysms occur in patients with serious heart disease, often with failure before the onset of their paroxysms, the proportion with ventricular tachycardia among those seeking advice because of their attacks will be still less—certainly not more than 1 in 50. Even with this small proportion a record of the attack to establish the diagnosis is important for prognosis.

ÆTIOLOGY

In four-fifths of the cases collected by Strauss (1930) the patients had serious heart disease. When his series are added to the 27 cases of Cooke and White (1943) and 15 of my own, 85 of 106 had serious heart disease and 21 were thought to have little else the matter with their hearts, though some had hyperthyroidism. Of those with heart disease 55% have congestive failure; 35% have a recent cardiac infarct and often both these factors; further, they have often been treated with digitalis. Levine (1945) found that 3% of patients with cardiac infarction had ventricular tachycardia soon after.

It was soon recognised that paroxysms were often caused by digitalis, not only by large doses but also by ordinary doses in a damaged heart. More than half the cases have had digitalis, and in more than a quarter—and in nearly all of the special bi-directional types—it was certainly the cause. Attacks have also been caused by adrenaline, atropine, and quinidine, and are not uncommon in severe diphtheria in children.

Ventricular tachycardia followed by standstill is the mechanism producing loss of consciousness in about a quarter of the cases of Stokes-Adams attacks, and ventricular tachycardia or fibrillation without standstill in another quarter.

Sex and Age Incidence.—Paroxysmal ventricular tachycardia is more common in men than in women. When the 94 reported cases of Lundy and McLellan (1934) are added to those of White and of myself, there were 95 men and 41 women—a higher male incidence than in the other paroxysmal tachycardias except flutter.

* The Lumleian lecture delivered at the Royal College of Physicians on April 16 and 18, 1946.

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Most cases occur between the ages of 40 and 70 (Campbell unpublished, Strauss 1930, Cooke and White 1943). The last series (27 cases) and my own (15 cases) have been tabulated separately: under the age of 40 there were 8 with normal hearts and 3 with heart disease; over 40 there were 2 with normal hearts and 29 with heart disease.

SYMPTOMS

Generally the patients are already seriously ill, and the rapid rate may be the last straw for a heart already overburdened, but even so the symptoms may sometimes be slight. Where the patient was in good health before the attack, the symptoms are the same as in auricular tachycardia.

THE RATE

This does not help in distinguishing ventricular and auricular tachycardias. The faster rates were found with more healthy hearts, perhaps because they alone can survive long at these rates. Levine and Strong (1923) thought that some irregularity during ventricular paroxysms might help the diagnosis on clinical grounds alone. Sometimes, especially at the start, the rate is a little irregular, speeding up from 150 to 190 or falling from 270 to 220 in a few seconds, and a slight irregularity may be found on measurement, especially in paroxysms interrupting auricular fibrillation or when the patient is moribund (Cooke and White 1943). Any obvious irregularity, however, is likely to indicate paroxysmal flutter with various degrees of block.

DURATION OF PAROXYSMS

Very short paroxysms lasting a few beats are much more common than with supraventricular tachycardias, occurring sometimes in half the cases. Nevertheless in longer attacks of over four days ventricular tachycardia is also proportionately more common, though still only a small minority of all attacks of this length. The longest attack I have seen lasted sixteen days; Elliott and Fenn (1934) reported one of thirty-two days, and White one of four or six weeks.

PROGNOSIS

The cases must be divided into a small group with no heart disease and a large group with organic heart disease, generally serious. Following Gallavardin, Strauss (1930) found that the prognosis was good in patients with no heart disease but extremely bad in those with organic heart disease, 80% having died in an average period of only twenty-four days. Cooke and White found two groups of those with heart disease: half of them dying within three weeks of the paroxysms; and half making an immediate recovery and dying, sometimes suddenly, a few months later, the longest having lived eighteen months. Of the 5 with hearts that were normal, 4 were known to be alive from two to fourteen years later.

Of my own patients 8 have died, but in 6 of these death was to be expected from their heart disease. On the other hand, a woman of 56, with auricular fibrillation and frequent short and longer paroxysms in which she was incapacitated, was to my surprise much the same five years later; 4 others were of the type described by Gallavardin (1922) with numerous extrasystoles and short attacks. In none of these did the attacks seem of any significance for prognosis.

A third small but important group should be distinguished: patients apparently without much the matter except these paroxysms, who can only be diagnosed electrocardiographically, but with a grave prognosis owing to the risk of ventricular fibrillation. Gallavardin and Froment (1930) described such a case, and a similar mechanism probably explains some of the unexpected deaths among reported cases. Because of this possibility the outlook in ventricular paroxysms is more serious, and this is one reason for trying to obtain an electrocardiogram of the paroxysm; fortunately they are rare.

Treatment

Some considerations common to all the paroxysms will be taken first. The treatment of the patient during attacks and the attempt to prevent their recurrence must be distinguished.

Quinidine is used so often that, to save repetition, some points about it will be considered here. When the diagnosis has been made, even between attacks, a test dose of 0·2 g. should be given to detect any idiosyncrasy. If this is all right, 0·4 g. may then be prescribed and repeated after two hours. These will be referred to as "small doses" and may safely be entrusted to the patient.

If the attack persists, the dose may be increased by giving the same amount at two-hourly intervals five times—i.e., 2 g.—but this should be done for the first time with the patient under observation and should be worked up to, except in an emergency. These will be referred to as "moderate doses."

Large doses—i.e., more than this—should only be given by those with experience of quinidine. The concentration in the blood will be increased more quickly by giving 0·8 g. or even 1·0 g. three times at the usual two-hourly intervals. As soon as quinidine has restored normal rhythm it may be omitted, unless there are reasons for thinking the paroxysms likely to recur in the near future.

Between attacks, when quinidine is used to prevent them, the object is not to reach a high level but to keep the quinidine constantly effective. The dose should therefore not be at two-hourly intervals but spread through the day in three or four doses; 0·4 g. t.i.d. may be taken as the routine, but more may be needed.

DURING ALL FORMS OF PAROXYSM

Rest should generally be advised, but past experience with a particular patient may show that relative rest is enough. Bed is rarely needed, unless special symptoms or the condition of the heart at other times make it advisable. Reassurance will take an important place, as the prognosis is good. If an attack persists towards evening, rest in bed and a sedative or hypnotic will often lead to its arrest. Other treatment will depend on the variety of the paroxysm.

Supraventricular Tachycardia.—Vagal stimulation by pressure over the carotid sinus is perhaps the best-known method. Pressure should be maintained for half a minute or so over the slight swelling of the carotid just before its division into its two branches above the omohyoid, where the artery comes out from under the sternomastoid to lie in front. The vagus is lying just external to the carotid. Pressure on either side may be successful, perhaps more often on the right. Pressure on the eyeball, invoking the oculocardiac reflex, may also be effective.

But all patients cannot apply these methods, and something that the patient can do himself is needed. Tricks of sudden movement—e.g., bending down to open a low drawer, and putting the head between the knees—will often be effective; provided the patient succeeds once he will generally do so again and often cease to be worried about his attacks. A forced expiration with a closed glottis after a deep inspiration is most constantly effective.

Quinidine in small or moderate doses is probably the most useful drug. Such remedies will have their place in the early phase of the paroxysm. The only risk of an attack is its prolongation so that thrombosis and embolism or congestive failure develop, and every attack persisting four days should be regarded as a medical emergency for admission to hospital or for treatment by someone with much experience of this disorder. In this way it is

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hoped that most risks could be abolished. Quinidine could then be used in larger doses, but some of the newer remedies can be tried more quickly and are often effective.

Starr (1936) found acetyl-β-methyl-choline chloride ('Mecholyl') effective in most attacks; it often caused stoppage of the heart for a few seconds, but he recorded no serious trouble from this. It is contra-indicated in serious heart disease; and in asthma and other allergic conditions a hypodermic of atropine gr. $^1/_{60}$ should be ready for use. Mecholyl was not very successful in my hands and often produced unpleasant symptoms of faintness and angina-like pains; perhaps too little was used, and the unpleasant symptoms might have been less noted if it had been successful.

'Prostigmin' subcutaneously or intramuscularly has been more effective and harmless.

Carbachol has also been successful in many cases, including some of my own. Birk et al. (1936) gave it intravenously (0·05–0·12 mg.) with success.

In cases without serious heart disease, the drugs should be tried in this order: mecholyl 20–40 mg., prostigmin 0·5–2·0 mg., carbachol 0·25–0·5 mg.; but it is too early to decide their special indications and limitations.

The position is likely to be changed by the work of Dawes (1946). Looking for quinidine substitutes for treating fibrillation he measured the effect on the refractory period of auricular muscle and found many drugs, some in general use for local anæsthesia—e.g., cocaine and amethocaine hydrochloride—much more effective than quinidine. I do not know if clinical trials have yet been made, but they seem likely to be effective.

Where other remedies have failed Levine (1945) advises quinidine sulphate 0·5 g. in 20 ml. of water intravenously, half this having been the minimal successful dose; or 20 ml. of 10% calcium gluconate or 15 ml. of 20% magnesium sulphate intravenously. Morphine is not desirable in ordinary recurrent attacks but may be used and may be effective if an attack lasts long and is causing serious anxiety.

The cessation of attacks after digitalis has often been reported, but it is doubtful if it is effective, and generally it should not be given, unless indicated apart from the paroxysms—e.g., by the development of failure in a long attack. But if the attack is thought to be flutter, full digitalisation is indicated.

Paroxysmal Auricular Fibrillation.—Quinidine in small or moderate doses is the treatment of choice. The arrest of paroxysms by stimulation of the vagus has been reported, but there does not seem to have been much systematic trial of this method. If the paroxysm is long, it is most important to try and stop it with quinidine; under these conditions full doses up to 0·8 g. three times at two-hourly intervals should be used.

The tendency for digitalis to favour the onset of fibrillation has been taken as a valid reason for not using it in the treatment of such paroxysms. But they may be stopped by it—not only short attacks where digitalisation is far from complete but also attacks of some days' duration, where it is being given in fairly large doses. Nor does digitalis always convert paroxysmal to established fibrillation with ease; in some patients it curbs the paroxysms and in others reduces their frequency.

Paroxysmal Auricular Flutter.—The treatment of choice is digitalis. It should be given in full doses and omitted at once when flutter changes to fibrillation. Often the rhythm will then revert to normal; and, even if it does not, the patient is generally better and more easily controlled with regular digitalis. Sometimes it does not produce fibrillation, or flutter returns. Quinidine should then be tried in the same amounts as for fibrillation, provided the state of the heart is no contra-indication.

Ventricular Tachycardia.—The treatment here is quinidine 0·4 g. repeated after two hours up to three or even five doses. Riseman and Linenthal (1941) have found intramuscular injection of quinidine bihydrochloride 0·5 g. in 5 ml. of water, repeated after two hours, effective in many cases where quinidine by mouth had failed. Bunn (1933) and Hepburn and Rykert (1937) reported favourably on the use of intravenous quinidine 4 g. (gr. 60) dissolved in 500 ml. of 5% glucose given at the rate of 100 ml. an hour. Magnesium salts (2–4 g.) intravenously may also succeed. Mecholyl has been used, but it is certainly dangerous and can only be recommended for young patients with normal hearts.

AFTER THE PAROXYSM

The first thing is to decide the nature of the underlying disease, if any. If thorough examination justifies it, reassurance about the nature of the attacks is sometimes all that is called for, and this alone may help to reduce their incidence. In fibrillation and flutter the possibility of hyperthyroidism must never be overlooked, for its correction by thyroidectomy often gives complete relief.

Dietetic and toxic factors must also be considered, and their treatment will sometimes succeed, though too much should not be expected of this. The avoidance of large meals will sometimes help. Similar considerations apply to the abuse of alcohol and tobacco, and reduction or even withdrawal will be found useful in a few cases. Work and exercise must also be reviewed, and in auricular tachycardia exercise may need increasing as well as diminishing when the heart is otherwise normal. A mild sedative may prove very useful.

If in spite of this the attacks are frequent and troublesome, the regular administration of quinidine 0·4 g. t.i.d. or less may greatly reduce or abolish the attacks. This may be effective in paroxysms of all sorts, least so perhaps in auricular tachycardia. So, besides its use in restoring normal rhythm, quinidine has won a rightful place in reducing the frequency of paroxysms. Occasionally the improvement is maintained when quinidine is withdrawn. Quinidine sometimes prevents fibrillation from becoming established.

Regular digitalisation has been recommended in paroxysmal auricular tachycardia, but it is rarely indicated and has not been useful in our experience. In ventricular tachycardia it must be avoided, as it is often the cause of attacks. In paroxysmal fibrillation digitalis has a more important place, though it should not be used till quinidine has failed. The production of fibrillation by digitalis has already been discussed, and it is only when the risk of established fibrillation has been accepted or is desired that digitalis should be used. Even then it is not always easy to produce fibrillation, and sometimes the attacks may be reduced.

SUMMARY

The paroxysmal tachycardias are an inconvenience rather than a sign of heart disease.

The prognosis should be judged by the state of the heart in the free intervals and not by the paroxysms.

Though ventricular tachycardia most often occurs with serious heart disease and is, in this sense only, of grave import, even it, and still more the other varieties, may occur with a normal heart and be of no significance for prognosis.

It is important to distinguish the different varieties, because the most effective treatment is somewhat different.

Often the condition cannot be cured, but generally treatment helps in reducing the length and frequency of attacks.

(*References at foot of next page*)

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PITUITARY BASOPHILISM

REPORT OF A CASE

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THE disease formerly known as Cushing's syndrome and now generally recognised as pituitary basophilism occurs, as Crooke (1935) has pointed out, in three distinct groups of cases: there may be (1) a basophil adenoma in the pituitary gland, (2) a neoplasm of the thymus, or (3) a neoplasm or hyperplasia of the suprarenal cortex without either basophil adenoma or thymic neoplasm. All three groups, however, show the same hyaline change in the basophil cells of the pituitary gland.

In the following case pituitary basophilism was associated with hyperplasia of the suprarenal cortex and a cyst in the posterior lobe of the pituitary.

CASE-RECORD

A woman, aged 23, was admitted to the Royal Melbourne Hospital on Nov. 22, 1935, with a history that in ten months her weight had increased by 22 lb. and her face, neck, and trunk had become larger, the waist-line increasing by 5 in. During this period hair appeared on her back, abdomen, and limbs, and her skin became coarser. Her menses had been normal until two months before admission, since when there had been amenorrhœa. For three months she had had a sensation of pressure between the zygomata, with momentary hot flushes; but she had no headache. Sleep, appetite, and bowels were normal; there had been slight frequency of micturition. Childhood had been healthy. Her appendix was removed in 1931, and an abscess of the umbilicus was drained six months before admission.

Investigation

The patient was a large-faced sensible girl, with a coarse beard and a growth of coarse hair on the limbs and trunk (fig. 1). The pubic hair showed a male distribution. The figure also was of the male type, with the shoulders broader than the hips. There was a well-marked increase of the subcutaneous tissue of the face, neck, and trunk, but not of the limbs. Temperature 98°F; pulse-rate 70 per min., pulse full and regular; respiratory rate 22 per min.; blood-pressure 140/90 mm. Hg. The breasts were small, and the skin of the trunk was coarse and greasy.

No abnormal physical signs were found in the heart and lungs. There was some tenderness on the right side of the abdomen over the kidney. The vaginal orifice was very small, making an examination of the genitalia difficult. Examination of the nervous system, and chemical and microscopical examination of the urine showed no abnormality. Glucose-tolerance test normal. The pituitary fossa had normal radiographic outlines. Basal metabolic rate −18%. A blood-count showed no abnormality except a slight shift to the left in the granular series. Blood-urea 20 mg., blood-cholesterol 175 mg., and blood-calcium 11·8 mg. per 100 ml. Urea concentration 3·75% in the third specimen. Chloride-balance tests normal. Visual fields and fundi normal. On radiography an irregularly rounded shadow was seen overlying the upper pole of the right kidney. This was thought to be consistent with a suprarenal tumour, but subsequent radiography did not confirm the finding. Intravenous pyelograms showed normal renal outlines and function. The patient was discharged but continued to gain weight.

Treatment and Progress

In February, 1936, deep X-ray therapy to the pituitary region was begun but had no beneficial effect, and in March purple striæ over the iliac crests and in the right axilla were noted. In April it was decided to give a course of deep X-ray therapy to both suprarenal areas. Her weight increased from 10 st. 10 lb. on Feb. 20, 1936, to 11 st. 5 lb. on Aug. 31, 1936, but on this day she reported the recurrence of a normal menstrual flow after amenorrhœa which had lasted twelve months, and some improvement in her general state of health and in her physical strength.

During the succeeding year menstruation was normal, but there were frequent backache, headache, and generalised pains. The abnormal hair was progressively but not completely lost. Menstruation ceased again in August, 1937; hirsuties recurred; and her weight, which had fallen to 10 st. 13 lb. in December, 1936, rose to 11 st. 9 lb. by October, 1937. Examination under general anæsthesia in November revealed a small underdeveloped anteverted mobile uterus. The right ovary was small, and the left very small.

Fig. 1—The patient in 1935.

Deep X-ray therapy to the right suprarenal area in November, 1937, gave no benefit, and she was readmitted to hospital on Feb. 16, 1938. At this time she was complaining of unsteadiness in the legs, constricting pain in the chest, radiating to the back, and headache. She had been very short of breath, especially on exertion, and had a feeling of pressure in the throat. The growth of hair had increased, and amenorrhœa continued. She had had occasional cramp-like pains in the legs. There was no alteration in the physical signs, and the blood-pressure was 130/80 mm. Hg. Blood-urea 43 mg. per 100 ml.; urea concentration 3·20% in the third specimen. Basal metabolic rate −14%. Aschheim-Zondek test negative. Blood-cholesterol 192 mg. per 100 ml.

Deep X-ray therapy was given to the pituitary region, without improvement. For the next three months the pain in the chest, back, and head continued, and pain in the fingers, wrists, and ankles developed. She felt drowsy and could not walk without feeling tired. Her appetite was poor but the

* Dr. Wright-Smith has died since the preparation of this paper.

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weight remained about 11 st. 9 lb. The blood-pressure remained the same, and there was no alteration in the physical signs.

Her symptoms persisted irregularly during the ensuing months despite administration of œstroform parenterally and thyroid gland by mouth. An electrocardiogram revealed left axis deviation and inversion of P3 and T3. Her weight varied between 12 st. in August, 1938, and 11 st. $8^1/_2$ lb. in December, 1938, deep X-ray therapy to the left suprarenal area being followed by a return of menstruation in November of that year.

During 1939 further deep therapy was given to the suprarenal areas, and menstruation continued until November; but in January, 1940, her weight had increased to 12 st. $5^1/_2$ lb., hair had reappeared over the trunk, and her former symptoms returned and remained despite another course of deep X-ray therapy. She had swelling of the feet and ankles, swelling of the mouth, some dimness of vision, insomnia, numbness of the fingers, cramps in the feet, pain in the back and abdomen, and headaches. She was readmitted to hospital on March 6, 1940.

The blood-pressure was now 230/145 mm. Hg, and the heart showed some enlargement. There were numerous subcutaneous ecchymoses on the arms and legs. Radiography of sella turcica, suprarenal area, and chest showed nothing abnormal. Bleeding and coagulation times were prolonged, and the blood-platelets numbered 89,000 per c.mm. The fundi showed a hypertensive neuroretinitis, with woolly patches of exudate and hæmorrhages. The visual fields were

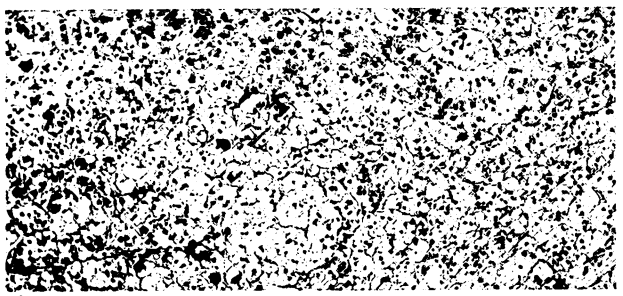

Fig. 2—Photomicrograph of suprarenal cortex. (× 75.)

restricted. Blood chlorides 496 mg., phosphates 3·6 mg., and cholesterol 220 mg. per 100 ml. Urine contained a large amount of albumin and many hyaline and epithelial casts. The patient became almost completely blind, and after severe attacks of cardiac asthma she died on May 14, 1940.

Necropsy

Heart weighed 450 g.; hypertrophy of left ventricle; muscle pale red and firm; cavities dilated; valves normal; coronary arteries patent but with moderate atheroma; aorta very atheromatous.

Lungs normal apart from congestion and œdema. Peritoneum and alimentary tract normal. *Liver* large (1920 g.), pale brownish-red, with a regular pattern. *Gall-bladder*, *spleen*, and *pancreas* normal. *Kidneys* normal in size (120 g. each), peeling readily, leaving a red mottled surface. On section, cortex narrowed in places, medulla fairly wide, substance mottled and firm; vessels somewhat thickened and pyramids somewhat irregular. *Uterus* small and fibrous; *ovaries* small and atrophic. *Skull* and *brain* normal. *Thyroid* gland normal in size, with several small colloid areas; red and fleshy. No *thymic tissue*.

Both *suprarenals* bright yellow, firm, and very large (each 6 × 4·5 × 1 c.cm.); combined weight 20·5 g. Cortex wide, with hypertrophy; medulla apparently normal; no tumour tissue.

Sella turcica normal in size; *pituitary gland* small, filling sella. Anterior lobe yellowish, soft, and uniform; posterior lobe replaced by small cyst (0·9 cm. at largest diameter) containing mucoid material.

Microscopy

Sections stained with hæmatoxylin-eosin, Weigert's hæmatoxylin-van Gieson, Weigert's elastin, and Crooke's modification of Mallory's acid-fuchsin aniline-blue method.

Suprarenals (fig. 2).—Hyperplasia of cells of cortex; normal zonal arrangement largely retained. Zona glomerulosa

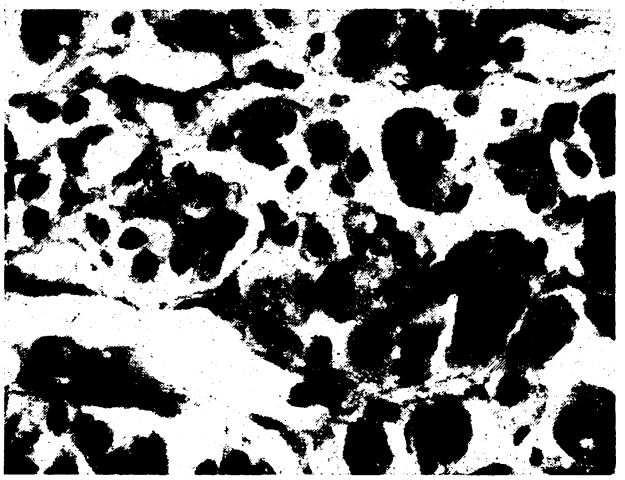

Fig. 3—Photomicrograph of pituitary gland showing hyaline change and vacuolation in basophil cells. (× 735.)

narrow, zona fasciculata very wide, and zona reticularis slightly wider than normal. Except in zona glomerulosa, cells heavily loaded with lipoid. Medulla normal and small in amount.

Pituitary.—Cyst in posterior lobe lined by ciliated columnar epithelium: appeared to have arisen in hypophyseal stalk. Separated from pars intermedia by small rim of posterior-lobe tissue. Relative proportions of acidophil, basophil, and chromophobe cells in anterior lobe apparently normal. Well-marked hyaline change in cytoplasm of basophil cells (fig. 3), many of which contained vacuoles. From most of these cells granules had disappeared, but a few showed a rim of granules at the periphery. No fine vacuolation of granules noted. No adenoma seen. No basophil cells in posterior lobe, which apart from cyst was of normal structure.

Kidneys.—Hyaline thickening of intima of afferent arterioles. In interlobular and medium-sized arteries intimal thickening and reduplication of internal elastic lamella, with narrowing of lumen. Glomerular atrophy, with hyaline fibrosis of Bowman's capsules and degeneration of tubules, beside areas of normal-looking renal tissue. Picture one of nephrosclerosis in essential hypertension.

Pancreas.—Hyaline thickening of intima of arterioles; smaller arteries sclerosed, with reduplication of internal elastic lamella. Parenchyma and islets of Langerhans normal.

Thyroid.—Hyperinvolution, with accumulation of colloid.

DISCUSSION

The clinical features initially pointed to the pituitary as the site of the disorders; and, as the right-sided suprarenal shadow could not be confirmed, it was decided to begin radiotherapy to the pituitary gland. Subsequent treatment and its effect is summarised in the table.

Date	Tissue dosage	Effect
January, 1936	1000 r to pituitary	No improvement
March, 1936 ..	600 r ,, ,,	,, ,,
May, 1936 ..	1200 r to right and left suprarenals	Immediate improvement, maintained for 14 months
November, 1937	3100 r to right suprarenal	No improvement
March, 1938 ..	2400 r to pituitary	,, ,,
July, 1938 ..	2500 r to left suprarenal	Immediate improvement
November, 1938	1750 r to left suprarenal	Improvement maintained
May, 1939 ..	1850 r to left suprarenal	,, ,,
January, 1940	1520 r to left suprarenal	No improvement (Death in May, 1940)

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It will be seen that irradiation of the pituitary did not bring improvement. Irradiation of both suprarenal gland areas in one field did so; but later radiation of one, the right suprarenal, did not reproduce the benefit, which was later again produced and maintained by irradiation of the left suprarenal. Finally the glandular symptoms recurred and renal failure took place.

Clinically this sequence seemed to justify the diagnosis of a left-sided suprarenal lesion; yet necropsy showed identical cortical hyperplasia in the two suprarenals. We can think of no reason for the failure of right-sided irradiation and the success of slightly smaller dosage directed to the left side. The possibility that a left-sided tumour was eradicated by the tissue dosage (2500 r) given in March, 1938, cannot be seriously considered, in view of the final recurrence of the original symptoms, the absence of tumour, and the bilateral cortical suprarenal hyperplasia found at autopsy. The higher tissue dosage given in the second and third courses to the suprarenal glands was an attempt to produce a maximal recession on a suprarenal tumour thought to be present.

Relation of Renal Damage to Irradiation.—The kidney is susceptible to damage by large doses of X rays. The initial changes are those of damage to the renal epithelium and to the vascular endothelium, and the epithelium of the convoluted tubules is said to be most sensitive. Œdema of the kidney, with vascular dilatation and degeneration and atrophy of the epithelial cells, is followed by diffuse fibrosis, thickening of the blood-vessels, and hyalinisation of the glomeruli; a contracted kidney results. Clinically these changes produce a syndrome of chronic nephritis with hypertension, retinitis, and albuminuria. The question therefore arises whether the irradiation had any ætiological connexion with the terminal nephritis and hypertension found in this case.

Assuming that each kidney received the same dosage as the corresponding suprarenal gland, the right kidney received two courses—i.e., 1200 r tissue dose, followed by 3100 r six months later—whereas the left kidney received tissue doses of 1200 r, 2500 r, 1750 r, 1850 r, and 1520 r, a total of about 9000 r in $3\frac{1}{2}$ years. Dosage of this order might cause degeneration, though the cumulative dosage is much less than that causing gross damage in the case described by Stanford Cade (1940), in which a dose of about 5000 r was administered during 50 hours by means of a radium bomb. But if the irradiation was responsible for the damage, one could expect this to be more obvious in the left kidney, which received more than twice as much as the right. The fact that the two were of identical size and weight (120 g.), and showed pathological changes of the same degree, makes it most unlikely that any significant renal damage was caused by the X-ray therapy, or that the malignant hypertension was originated by the irradiation. The renal failure of this case falls into its proper place as one well-recognised feature of Cushing's syndrome.

SUMMARY

In a young woman the symptoms of pituitary basophilism were not relieved by irradiation of the pituitary gland or of the right suprarenal gland. Considerable benefit, however, was obtained from irradiation of the left suprarenal.

At necropsy the condition of the two suprarenals (cortical hyperplasia) was identical.

The usual hyaline change was seen in the basophil cells of the anterior lobe of the pituitary gland, the posterior lobe of which contained a cyst.

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NEUROPATHY AFTER STILBAMIDINE

TREATMENT OF KALA-AZAR

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KALA-AZAR may be seen in this country among those who have served in endemic areas, for its incubation may be as long as two years. Thus an account of the after-effects which we have noted in patients treated with diaminostilbene (stilbamidine) may be of interest.

Neither Adams and Yorke (1939), who first used stilbamidine in kala-azar, nor Kirk and Sati (1940) reported any late effects of stilbamidine treatment, but Napier et al. (1942) found that several months after treatment with stilbamidine 9 out of 101 patients developed a peculiar nervous sequel, which had already been described by Napier and Sen Gupta (1942). Sen Gupta (1943) further described the neuropathy, which by then had been detected in 17 out of 104 cases. It consisted of areas of paræsthesiæ and of anæsthesia to light touch, and occasionally to pain over the distribution of the trigeminal nerve, with preservation of sense of temperature and pressure. In a few cases these symptoms spread to the neck.

Oastler and Fidler (1946) reported that 2 patients with Sudanese kala-azar treated with stilbamidine had died, late in convalescence, from renal, hepatic, and pancreatic damage, and that the same solution of stilbamidine, administered later to dogs, had caused hepatic and renal lesions. No such lesions were produced in dogs by freshly prepared solutions of stilbamidine; so it was concluded that the original solution had become toxic with ageing. These observations were made in 1941 before it was known that stilbamidine became toxic after exposure to light (Fulton and Yorke 1942, Fulton 1943). However, though the freshly prepared solution produced no significant changes in the liver, kidney, or pancreas, lesions were found in the central nervous system of the dogs, associated with clinical signs.

The clinical picture resembled decerebrate rigidity, and macroscopic and microscopic lesions were found post mortem in the central nervous system, most commonly in the thalamus and caudate nucleus but also in the cerebral cortex, subcortical tissue, cerebellum, brain stem, and spinal cord. Microscopically the lesions consisted of myelin degeneration and infiltration with polymorphs, small round cells, and erythrocytes. There was no apparent relationship between the degree of nervous damage and the amount of stilbamidine given.

Our first patient had been invalided to England from Malta in November, 1943, because of protracted fever with severe anæmia, leucopenia, and splenomegaly. Kala-azar was diagnosed after sternal puncture, and he was transferred to the Queen Alexandra Military Hospital. After a blood-transfusion he was given two courses of stibamine glucoside ('Neostam') intravenously, the first totalling 2·1 g. and the second 3·2 g., but apart from slight decrease of his fever he showed no improvement. He was then given intravenous stilbamidine, an initial dose of 0·1 g. in fresh solution being followed by 0·15 g. on alternate days up to a total of 1·45 g. After the seventh injection the fever subsided and his general condition improved dramatically. A few weeks later he was fit to leave hospital convalescent.

Meanwhile there was a steady flow into the hospital of soldiers with kala-azar from North Africa, Sicily, and Italy, both fresh cases and patients who had already been treated with antimonial drugs without success. They too were given stilbamidine, and our first impres-

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sions were very good. By the end of 1944, however, an alarming number of patients returning for follow-up examination were being found to have facial symptoms, and two relapses occurred (Hargreaves 1947).

Sandes (1944) was finding urea-*para*-amido stibinic acid (urea stibamine) satisfactory in kala-azar in patients returning to England from the Mediterranean, and General Sir Alexander Biggam obtained this and an allied drug, urea-*para*-aminophenyl stibinic acid (carbostibamide), from India. We then stopped using stilbamidine and substituted these drugs, which have proved entirely satisfactory in the treatment of both Mediterranean and Indian kala-azar. The average patient was given two courses totalling 3 g. each of daily intravenous injections, and as a rule the fever subsided in two or three days after the start of treatment.

Urea stibamine and carbostibamide were equally effective, but the patients preferred carbostibamide, because the transient symptoms—flushing, cough, nausea, &c.—during injection were much less and often absent. In comparison with these drugs stilbamidine had been troublesome to administer. Because of its tendency to cause local venous thrombosis at the site of injection it was necessary to dissolve it in at least 200 ml. of distilled water. Again, the transient symptoms caused by an injection of stilbamidine were often severe unless it was given very slowly—generalised flushing with a burning sensation, headache, giddiness, palpitation, epigastric pain, nausea, and vomiting. One patient developed auricular fibrillation lasting several hours after an injection.

INCIDENCE OF NEUROPATHY

Altogether 24 cases of kala-azar had been treated with stilbamidine at the Queen Alexandra Military Hospital before the high toxicity of the drug was recognised. Two further patients had received stilbamidine abroad. One of these was an invalid from Italy with prolonged fever and leucopenia. We diagnosed brucellosis and to our surprise he complained during convalescence of numbness and burning in his face and lips. We found that a course of stilbamidine had been given to him empirically eight months previously. The total dosage given to our patients was 0·6–3·2 g., and we found no relationship between the dose of stilbamidine and the severity of nervous complications.

We have followed up 24 patients for periods up to three years, and 22 have developed evidence of neuropathy at intervals ranging from two to eight months after treatment. The 2 apparently unaffected patients were among those who lived too far away to attend for examination but who answered a written questionnaire. Another of this group wrote to tell us that he was quite well and back at his old civilian job but had to attend a psychiatric clinic because of a queer feeling in his face.

This incidence of the neuropathy in over 90% of our patients is very much higher than the Calcutta figure of 16%. Sen Gupta (1943) was careful to point out, however, that the incidence might be higher than the figures indicated, since not all his patients were followed up and the 17 who complained of facial symptoms were mostly of the more intelligent type.

CLINICAL PICTURE

Symptoms.—The main symptoms were numbness of the face and sometimes the scalp, neck, and chest; paræsthesiæ in the same areas, varying from pins-and-needles to a sensation of hot water trickling over the skin; hyperæsthesia, shaving, or a light breeze on the face often causing agonising pain; itching of the eyelids, with watering of the eyes and sometimes a sticky secretion; and fine twitching of the muscles round the eyes with frequent blinking.

Signs.—Sensory changes were found over various areas supplied by the fifth cranial nerves and the cervical and upper dorsal sensory roots. The skin over the affected areas sometimes appeared dry and atrophic. The type of sensory loss was fairly constant, consisting of impaired perception of light touch, blunting of pin-prick, and impaired temperature sensation. When these changes were extensive, vibration sense was also lost in some cases over the bridge of the nose and the chin. Occasionally the corneal reflex was depressed, but it was never absent. Deep pressure and pain sensibility, two-point discrimination, and the jaw-jerk were normal in all cases. Fine twitching of the face and eyelids, with lacrimation, were commonly seen, presumably of reflex origin from irritation of the sensory mechanism of the fifth cranial nerve.

These findings differ from those of Napier and Sen Gupta (1942) and Sen Gupta (1943), who reported that perception of light touch and occasionally pain sensation were affected. In a few of their cases the neck was involved as well as the face; in some of our series, as already noted, the sensory changes spread to the chest.

Onset.—The symptoms came on two to eight months after stilbamidine treatment. The first complaint was usually numbness or pins-and-needles over the upper lip and tip of the nose, the patient often noting that he could not feel a cigarette in his mouth. During the next few days, or occasionally weeks, the symptoms would spread to the whole trigeminal area on both sides and sometimes the cervical and dorsal dermatomes.

Course.—The condition usually remains stationary at its maximal extent and severity from eighteen months to two years, after which it gradually improves. Sensation usually returns in the reverse order to that in which loss occurred, but a few patients, whose symptoms started over the third division of the trigeminal nerve, now show residual signs in the first division only. In one case the numbness spread to the neck in the first two weeks but receded after a further week, leaving only facial signs. We have not found any treatment to influence the progress of the condition, but soluble phenobarbitone has given some symptomatic relief to patients with very severe paræsthesiæ. In most of the patients this neuropathy was a very real disability, and there was no difficulty in detecting old stilbamidine cases in the wards by their miserable expression with blinking and tearful eyes.

ILLUSTRATIVE CASES

Case 1.—December, 1943, to February, 1944: stilbamidine, three courses, total 3·08 g.

May, 1944: numbness and paræsthesiæ over forehead, spreading in a few days over whole face, then receding to left forehead and cheek.

October, 1946: persistent symptoms on left side of face, sometimes spreading over whole face for a day. Sensory changes found over right and left trigeminal areas; pain, light touch, and thermal sensation lost in divisions I and II; loss of light-touch sensation only in division III.

Case 2.—March, 1944: stilbamidine 2·25 g.

July, 1944: numbness of lips, spreading in three months over whole face, scalp, neck, and upper chest, with severe paræsthesiæ.

June, 1946: symptoms improving over chest. Loss of pain, light touch, and thermal sensation over right and left trigeminal areas and cervical dermatomes 1–5.

Case 3.—March, 1944: stilbamidine 1·5 g.

November, 1944: pins-and-needles and perverted sensation over face.

June, 1946: symptoms persist; no sensory loss detected.

Case 4.—May to August, 1944: stilbamidine, two courses, total 2·95 g.

November, 1944: perverted sensation over cheeks; light touch very painful. In a month this spread over whole face and forehead.

February, 1945: perverted sensation subsided, but numbness developed.

June, 1946: numbness of forehead and itching of eyelids; findings as in case 1; typical dissociated sensory loss in divisions I and II of trigeminal nerves; loss of light-touch sensation only in division III.

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Case 5.—January, 1945: stilbamidine, amount not known, in Italy.

September, 1945: burning sensation in lips, then pins-and-needles with numbness spreading in a few months over face, scalp, neck, and upper chest. Symptoms gradually receded from chest.

June, 1946: loss of pain, light touch, and temperature sensation over right and left trigeminal areas and cervical dermatomes 1–3; vibration sense lost over bridge of nose.

Case 6.—July, 1946: stilbamidine 0·6 g. in another hospital.

October, 1946: numbness of nose and upper lip, with paræsthesiæ, spreading in four days over whole face; loss of pain, light touch, and thermal sensation over right and left trigeminal areas. Ten days later these changes extended down to 3rd cervical dermatome, then receded rapidly.

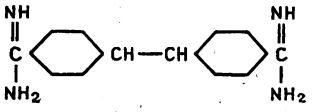
November, 1946: impaired pain and light-touch sensation only over both trigeminal areas.

DISCUSSION

This condition is of neurological interest from two points of view: the localisation of the lesion, and the mode of action of stilbamidine on the central nervous system.

Napier and Sen Gupta (1942) suggested that the lesion was in the principal sensory nucleus of the trigeminal nerve, and Sen Gupta (1943) later postulated that the process might extend caudally into the spinal tract of this nerve and its nucleus. It seems from the more extensive physical signs which we have noted, that stilbamidine may affect not only the principal sensory nucleus and the nucleus of the descending tract of the trigeminal nerve but also the central grey matter of the spinal cord near the substantia gelatinosa Rolandi. The fact that these collections of grey matter form a continuous column of cells which are morphologically similar makes this localisation probable. In the dog stilbamidine has a diffuse effect on the grey matter (Oastler and Fidler 1946), but in man it appears to have a special affinity for this one column of cells. Other examples of specific affinity are known, such as that of trivalent arsenic for the optic nerves and trichlorethylene for cranial-nerve nuclei, particularly the fifth.

The structure of stilbamidine (see figure) is such that it is related to trichlorethylene through its ethylene



linkage, and by reason of its diamidine groups it is akin to diamidino-di-phenoxy-pentane (pentamidine), another synthetic antiprotozoal drug, which is known to cause polyneuritis. Snapper (1947) is using stilbamidine in the treatment of multiple myelomatosis, and during the treatment he has noted specific morphological changes developing in the cytoplasm of the myeloma cells, in which granules of ribonucleic acid appear. His results indicate that in this particular disease the beneficial effects of stilbamidine outweigh its disadvantages.

SUMMARY

Stilbamidine was used in the treatment of Mediterranean kala-azar in 1944, and the results seemed good until an alarming number of patients developed numbness and paræsthesiæ over the face, often spreading to the neck and chest.

These symptoms appeared two to eight months after treatment in over 90% of cases—a much higher figure than the 16% reported from Calcutta, where not all the patients were followed up.

Urea stibamine and carbostibamide were effective in all our subsequent cases of kala-azar, both from the Mediterranean theatre and from India.

The clinical features of the neuropathy are described, with illustrative cases. The symptoms tend to remain at a peak for about 2 years, and then improve gradually. The nature of the lesions is discussed.

Our grateful acknowledgments are due to Major-General Sir Alexander Biggam and Brigadier J. Bennet for their kind help and advice, and to the many medical officers who assisted in this work at the Queen Alexandra Military Hospital.

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QUARTAN MALARIA TRANSMITTED BY BLOOD-TRANSFUSION

REPORT OF A CASE

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It has been demonstrated repeatedly that human malaria may be transmitted by blood-transfusion. Thomas et al. (1936), in describing the first case in the British literature, emphasised the risk of employing as a donor anyone who had resided in a malarious district. After the case of Nabarro and Edward (1939), Hutton and Shute (1939) suggested that civilian donors who had lived in the tropics or subtropics should not be used if other blood-donors were available. Now that so many ex-Service men and women are potential donors, there may be a tendency for this advice to be disregarded. The following case emphasises the risk of using donors who have visited malarious areas but have not had clinical malaria.

CASE-HISTORY

Mrs. A, a primipara, aged 18, with group-A blood, was given an antepartum transfusion on March 8, 1946. She had never travelled outside the Tyne Valley area of Northumberland and co. Durham. Her Hb level rose from 40% to 64% after the administration, without reaction, of two pints of 3-day-old stored group-A blood. She was discharged, and on March 14 returned in labour and was delivered of a full-term healthy son.

Her puerperium was normal, except that on March 20 she had a slightly elevated temperature, interpreted as due to constipation, which was treated with suitable aperients. This was the only pyrexia recorded, and she was discharged well on the 24th.

About five or six weeks after her return home, seven or eight weeks after the transfusion, she started to feel run down. At the same time her sister, with whom she shared a bed, refused to sleep with her, because Mrs. A became soaked with sweat during the night.

The patient was not unwell enough to consult a doctor before she entered the county postnatal convalescent home on June 15, when she was thought to have a cold. On the 16th she had what must have been a slight rigor; she was well the next two days, but had a definite rigor on the 19th, which was repeated, as shown in the temperature chart. She was investigated on the 25th, when typical quartan malarial parasites were seen in the blood smears; at that time she was pale, with an easily palpable spleen and liver. Blood-count: red cells 3,600,000 per c.mm., Hb 10·5 g. per 100 c.cm.; white cells 3000 per c.mm. (polymorphs 73%, lymphocytes 23%, mononuclears 1%, eosinophils 3%). Blood-sedimentation rate in 1 hour at 20°C (Wintrobe): patient 53 mm., donor I 9 mm., donor II 5 mm.; corpuscular volume, patient 33 c.cm., donor I 42 c.cm., donor II 46 c.cm.; corrected rate, patient 27 mm., donor I 6 mm., donor II 6 mm. (Hynes and Whitby 1938). Mean corpuscular volume 91 c.μ. Mean corpuscular hæmoglobin concentration 32%. Stained film showed normal red cells except for the contained malarial

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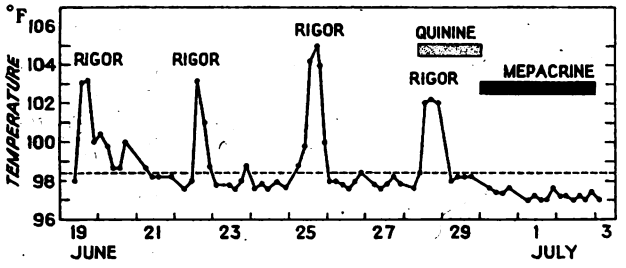

parasites. Serum did not agglutinate *Br. abortus* emulsion in all dilutions from 1/25 to 1/2500. Blood-culture proved sterile. Plasma: paler than normal, no icterus present.

Patient was treated with quinine gr. 10 t.d.s. for two days and then mepacrine gr. 3 t.d.s. for five days; her temperature fell and remained down after the 28th (see figure). Up to the age of five months the child has shown no evidence of a malarial infection.

THE DONORS

Donor I had been on a cruise which allowed her to land for a few hours at Algiers; no parasites were seen in her blood smears.

Donor II was a ship's engineer who, in 1939, had travelled to Aden, Abadan, and Basra, the trip taking about five months. He had never had malaria, though several of the crew had "3-day malaria" on the voyage back. On his return to England in the summer of 1939 he was liable to feel cold and would go to bed for an hour during the day, but he did not consult a doctor. Since then he has never been out of England and never had any illness except "flu" during a local epidemic; in a thin smear of his concentrated centrifuged blood (Rogers 1946) a definite quartan male gametocyte was found.

Blood taken from both donors on July 4 was injected into two patients with general paralysis of the insane who belonged to blood-group A. No evidence of malaria has yet appeared in the patient given the blood of donor I; but the patient given the blood of donor II developed malaria on Aug. 5.

As shown above the sedimentation-rate was not raised in the donor who was the active malarial carrier.

DISCUSSION

Cases of malaria transmitted by blood-transfusion appear to be more common in America and France than in England; Wright (1938) added 6 of his cases to make a collected total of 29, of which the only English example was that of Thomas et al. (1936). Since then McCulloch (1937), Gurian (1941), Marks (1941), Zussman and Silver (1938), and Gardner (1938) have described cases, all of which were quartan infections in America; in England Nabarro and Edward's (1939) case has been reported, and Banks (1946) had another case in a pregnant woman.

The malaria transmitted by donors who have not been resident in malarious areas for many years are nearly all quartan infections; but in the cases reported by Harvier et al. (1934) and Wright (1938) the malaria was benign tertian and the donors had carried malaria parasites for three and ten years respectively. Shute (1944) states that quartan malaria is not, as was once supposed, so much rarer than benign tertian or malignant tertian, at least in some malarious regions; therefore ex-Service personnel who have not had clinical malaria may well act as carriers of quartan or benign tertian malaria if used for blood-transfusion. Whitby (1942) stated, and Lozner and Newhouser (1943) demonstrated, that the risk of transmission of malaria by plasma is practically non-existent.

I suggest that all donors who have been resident in malarious areas, whether they have had clinical malaria or not, should be bled only for the production of serum. This will prevent the transmission of malaria parasites, and those who have had malaria will be available as safe donors.

SUMMARY

A case of quartan malaria, with a long incubation period, has been described. It was caused by a blood-transfusion from a donor who had never had clinical malaria and who had lived five months in a malarious area seven years before.

The blood-sedimentation rate was not raised in the malaria carrier.

It is suggested that the blood of donors who have been exposed to possible infection with malaria should be used only for producing serum.

I wish to thank Drs. I. McCracken and E. Ewen for permission to publish this case; Drs. C. B. Bamford, A. L. Banks, T. H. Boon, A. Hart, W. D'A. Maycock, and P. G. Shute, Prof. H. E. Shortt, Miss E. Lowe, Mr. C. H. Holland, and W. Ralph for their help and criticisms.

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Medical Societies

MANCHESTER MEDICAL SOCIETY

Lung Abscess

IN an address to this society on Oct. 1, Mr. W. F. NICHOLSON said that the common cause of lung abscess is bronchial obstruction with secondary infection. In normal health the cilia lining the bronchial tree keep the air-passages free from organisms and debris. When ciliary action is impaired by trauma, infection, or growth, coughing prevents bronchial obstruction; but when coughing is embarrassed by pain or anæsthesia or tenacious secretion, bronchial obstruction may occur. Abscess due to bronchial embolism arises at the periphery of the lung, though it may not present on the costal surface. Because the subapical segment of the upper lobe and the apical segment of the lower lobe are the most dependent bronchi in the lateral and supine positions respectively, these segments are most frequently affected; consequently, the majority of inhalation abscesses present on the costal surface of the lung corresponding to these segments. Upper-lobe abscess is common after operations on the upper respiratory tract, in which a lateral position is commonly employed during the immediate postoperative period. Lower-lobe abscess is often due to abdominal operations, associated with a supine or Fowler's position. Putrid lung abscess often goes undiagnosed because it is still not widely known that such an abscess can exist without foul sputum. When the abscess ruptures into the bronchial tree, sputum will be present; but even before this happens the breath may be fœtid.

Treatment is by drainage, either bronchial (postural) or external (by operation). In either case localisation of the lesion must be exact if treatment is to be rational. The responsibility of the physician in these cases is heavy: if he delays external drainage the disease may spread to a diffuse suppurative pneumonia of a lobe, which will eventually require lobectomy; moreover, the immediate mortality of conservative treatment is considerable. Only when the physician shares responsibility with the surgeon from the beginning can drainage be instituted promptly if medical measures fail. Chemotherapy and antibiotics, though of value, do not replace drainage. Bronchoscopy is of help in localising the broncho-pulmonary segment of the abscess, in improving bronchial drainage, and in excluding the possibility of foreign body or growth; as a curative measure it is little better than postural drainage. Surgical drainage decreases mortality and morbidity.

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Reviews of Books

Practical Handbook of Leprosy

R. G. COCHRANE, M.D. Glasg., F.R.C.P., medical secretary, Mission to Lepers; principal, Missionary Medical College, Vellore, South India. London: Oxford University Press. 1947. Pp. 283. 42*s*.

FOR those who have not seen leprosy, or have seen only a few cases, it is often difficult to make a definite diagnosis; and, having made a diagnosis, to classify the type or make a reliable prognosis. To all such, Dr. Cochrane's book will be valuable, especially because of its plates, which vividly illustrate the innumerable forms which leprosy presents. The book relates chiefly to leprosy in India, and particularly in Madras, where the author has gained most of his experience. Atypical forms of leprosy, especially of those found in early childhood, are described in great detail. These forms are the most difficult to understand, and opinion is still much divided about their significance and the best way of classifying them. Dr. Cochrane still places his faith in hydnocarpus oil as the sheet-anchor of treatment in lepromatous leprosy, which is the severe form of the disease; he mentions sulphone treatment only incidentally in a short paragraph. The chapters on the control of treatment, lepra reaction, and the various subsidiary forms of treatment are full and practical. The most important part of the book is perhaps the last section of three chapters dealing with prevention. The methods he has used in the Madras Presidency are given in detail. Not only are the therapeutic measures prescribed, but the social improvement of the people; and this section should be studied carefully by all who seek to launch a campaign against the disease. At the end there are four appendices, giving practical methods of carrying out surveys, and recording the lesions of patients. Unfortunately there are some textual mistakes in the book, and some of the statements will not be very clear to those who are not familiar with leprosy; but on the whole it is beautifully produced.

The Chest

A Handbook of Roentgen Diagnosis. LEO G. RIGLER, M.D., professor of radiology, University of Minnesota. Chicago: Year Book Publishers. London: H. K. Lewis. 1946. Pp. 352. 36*s*.

SOME of the previous volumes in this series have been an unhappy combination of textbook and atlas. Prof. Leo G. Rigler has made no such mistake, but has produced a really good radiographic atlas of the common lung diseases. There are 338 plates, most of high quality, and the text with each is short and to the point. He assumes that his readers will have some knowledge of radiographic interpretation and a wide knowledge of lung pathology. This book will prove most useful to chest physicians and radiologists.

Jameson and Parkinson's Synopsis of Hygiene (9th ed. London: J. & A. Churchill. 1947. Pp. 791. 28*s*.).—The ninth edition of this outstanding textbook has been prepared by Brigadier G. S. Parkinson assisted by Miss Kathleen M. Shaw, of the London School of Hygiene and Tropical Medicine. Besides giving some picture of the replanned health services, they have considered the regulations made under the Education Act, 1944, rewritten the hospital section, and revised the other chapters in the light of the General Medical Council's new rules for the diploma in public health.

Diabetes and Food Rationing (3rd ed. London: H. K. Lewis. 1947. Pp. 32. 1*s*. 3*d*.).—This is a good clear pamphlet written to help the diabetics attending University College Hospital in their diet difficulties and especially those of food-rationing. It sets out different fixed calorie and carbohydrate levels, giving abundant alternatives. The carbohydrate varies from 150 to 285 grammes; in these days of bread and cereal rationing and potato shortage the latter quantities must be difficult to obtain.

Messrs. Macmillan inform us that in our review of *Human Genetics* by Prof. R. Ruggles Gates (*Lancet*, 1947, i, 911) the price given was that originally announced. Shortly afterwards however this figure was reduced to £3 15*s*.

New Inventions

SPLINT FOR FRACTURED CLAVICLE AND ACROMIOCLAVICULAR DISLOCATION

FRACTURES of the clavicle usually unite readily, but the cosmetic results are often disappointing, for the methods of splintage commonly adopted, most of which are designed to brace the shoulders back, will rarely correct the chief deformities.

The loss of the strut-like action of the clavicle allows the shoulder girdle to fall under the action of gravity and to be drawn inwards by the pull of the muscles arising from the trunk. Böhler's original clavicle splint was designed to correct these two deformities, but it has the disadvantage of being rather clumsy and uncomfortable to wear. For some time I have been using a splint which, while embodying the admirable principles advocated by Böhler, gives the patient greater comfort. It consists of a light aluminium frame (fig. 1) shaped to fit the chest wall and held against the trunk by a washable corset (fig. 2). The upward lift of the

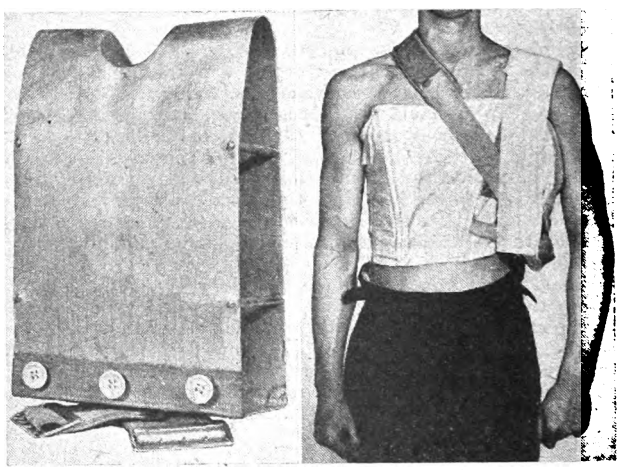

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Fig. 1—Aluminium splint.

Fig. 2—Splint applied, with corset and strapping, for acromio-clavicular dislocation.

splint is regulated by a strap passing over the sound shoulder, which should be adjusted so that the affected shoulder is above the level of its fellow. To avoid undue pressure on the axillary neurovascular bundle the upper border of the splint must be generously padded with a thick layer of splint wool, which is placed beneath a flap of the corset covering the top of the splint.

This splint is not only effective in correcting the depression of the shoulder but also acts as a wedge in the axilla and restores the width. With the splint in position pain at the fracture site is abolished and the patient can dress and move the arm at the shoulder freely. In most cases the fragments fall into satisfactory alignment; but, when the fracture is transverse and the clavicle displaced, it may be difficult to obtain accurate apposition.

The treatment of dislocations of the acromioclavicular joint, which are notoriously difficult to reduce with strapping placed over the shoulder and round the elbow, is simplified by the use of this splint. The shoulder is first lifted up to the dislocated clavicle; then by passing turns of 'Elastoplast' over the point of the shoulder (previously padded with adhesive felt) and below the splint (fig. 2) the distal end of the clavicle can be held firmly against the acromion. The splint must be worn for 6–8 weeks according to the severity of the dislocation, but the shoulder-joint can be exercised freely throughout.

The splint and corset have been made for me by Messrs. Masters & Son, 240, New Kent Road, London, S.E.1.

J. S. BATCHELOR, F.R.C.S.
Orthopædic Surgeon to Guy's Hospital.

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THE LANCET

LONDON: SATURDAY, NOV. 8, 1947

Information Offices in the New Service

ONE of the faults of the present system of medical care has been that although almost every form of treatment is obtainable, somewhere or somehow, it has been nobody's business to know where or how. The special hospital, clinic, or unit has dealt faithfully with the patients who come to it but has been under no obligation to advertise its functions, let alone to see that everyone who might benefit from its attentions does so. Exceptions, of course, are the clinics of the health authorities—infant welfare, tuberculosis, venereal diseases, and so on—which do try to make their functions known to the public. In the new service a doctor will be free to prescribe any treatment he thinks necessary for his patients; moreover, he will be able to demand it of the service as a whole. The regional boards must therefore know what treatment is available for the patients in their regions, and there must be some simple and quick way of handing this information on to doctors who ask for it.

The advent of the National Health Service will inevitably lead to much reorganisation of the present rather haphazard pattern, and each step is bound to upset the existing arrangements with which doctors have become familiar. Some small hospitals will be absorbed by big ones; some will be upgraded and some the reverse. No doubt doctors will be kept informed of relevant changes by circulars and the like, but they cannot hope to keep every alteration or innovation in their heads or even in their files. Then there are the everyday problems of practice which waste so much of the busy doctor's time. Perhaps a patient is having outpatient treatment at a hospital in Warwickshire and is going to London for a few weeks on business; his doctor will want to tell him the most convenient London hospital which will continue the treatment and when its outpatient sessions are. Then there are the questions about convalescent homes, about scarce drugs or equipment, about the help that voluntary organisations can offer in a specific case—questions perhaps that have stumped even the hospital almoner. If Thomas Cook can tell an inquirer what hotels are suitable for his needs at the other end of England, and at what price, surely the same can be done with hospitals, clinics, and the many auxiliary services of which a medical system is built?

There is a need, then, for information offices—perhaps one in each region, since many of the questions received will refer to local matters. It would be possible to run such an office with a purely lay staff, for an indexing system, built up as knowledge is gathered and kept accurate and up to date by constant revision, should provide the answers to most of the doctor's likely questions and should tell the intelligent operator where to apply for more out-of-the-way information. A lay staff, moreover, will not succumb to one of the temptations which beset such bureaux—that of giving professional advice on insufficient data. It might be advisable to combine the regional information office with some kind of emergency bed service, so that in urgent cases the doctor, having been told where his patients can be sent, could make arrangements for their transport and admission. In London it would be simple to graft an information office on the existing E.B.S. of the King's Fund, and the experience so gained would be invaluable to other regions considering a similar symbiosis.

Homologous Serum Hepatitis

TEN years ago it was noted [1] that a high proportion of the recipients of two batches of pooled human serum used as measles prophylactic had developed jaundice about two months afterwards; 9 of the cases were fatal. In the same year there were some cases of jaundice developing a similar time after the patients had received yellow-fever vaccine containing human serum, and the jaundice in this group was shown not to be due to infection with yellow-fever virus.[2] It seemed likely that there was some hepatotoxic substance in human serum causing the jaundice. Attention was drawn to the fact that the "staggers," described in 1919 by THEILER [3] in horses immunised against horse-sickness, resembled the serum jaundice in man. A somewhat similar condition appeared in the U.S.A. in 1937 in horses injected with immune horse-serum, either alone or together with equine encephalomyelitis virus vaccine,[4] and in Scotland in 1938 when horses had been injected with an immune horse-serum in an attempt to prevent grass-sickness.

Summing up the position in 1938, FINDLAY and MACCALLUM [5] noted that in every case the inoculum contained homologous substances, either in the form of homologous serum or homologous tissue suspensions. It was possible that the jaundice was the result of hypersensitivity to some constituent of the homologous serum, but anaphylactic effects rarely involve the liver and it was difficult to make out what constituent of the homologous serum could be responsible for a hypersensitivity phenomenon. Other suggestions were that some apparently normal sera might contain an hepatic antibody which damages liver cells, or that a hypothetical virus was present in the serum of some apparently normal human and horse-sera. A year later FINDLAY and his colleagues [6] decided that the most satisfactory explanation of the jaundice following yellow-fever vaccination was that the agent of infective hepatitis had been present in the apparently normal human serum used in the preparation of the icterogenic vaccine. From 1940 onwards there were innumerable reports of this kind of delayed jaundice following the injection of pooled adult serum or plasma, samples of whole blood, or certain batches of yellow-fever vaccine containing apparently normal human serum. In 1943 medical officers of the Ministry of Health prepared a memorandum [7] in which they collected all known incidents of jaundice following the use of homologous blood products; serum was the only definitely proved

1. Propert, S. A. *Brit. med. J.* 1938, ii, 677.
2. Findlay, G. M., MacCallum, F. O. *Trans. R. Soc. trop. Med. Hyg.* 1937, **31**, 297.
3. Theiler, A. *Rep. vet. Res. S. Afr.* 1919, **5**, 7.
4. Marsh, H. *J. Amer. vet. med. Ass.* 1937, **91** (n.s. **44**), 88.
5. Findlay, G. M., MacCallum, F. O. *Proc. R. Soc. Med.* 1938, **31**, 799.
6. Findlay, G. M., MacCallum, F. O., Murgatroyd, F. *Trans. R. Soc. trop. Med. Hyg.* 1939, **32**, 575.
7. *Lancet*, 1943, i, 83.

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source, so they adopted the term "homologous serum jaundice" to cover the whole group.

Thus homologous serum jaundice gradually came to be recognised as a definite entity associated with the injection of an agent, probably a virus, present in the serum of apparently normal people, and the term has served its purpose. However, since it has become recognised that the agent may be present in plasma or whole blood and not only in the serum fraction, the name is somewhat misleading, as Dr. ASHER points out in his letter in this issue. There have been cases, even recently, where pathologists and clinicians have not considered the possibility of homologous serum jaundice because the patient had received only plasma. With the further recognition of subicteric cases, as in infective hepatitis, it is clear that "hepatitis" should replace "jaundice." Is it time that "homologous serum" also gave place to something more correctly descriptive? FINDLAY [8] has recently suggested "hæmatic jaundice (hepatitis) of (*a*) human or (*b*) bovine origin." To many, this term may suggest an association with only the red blood-cells. "Hæmatogenous hepatitis" has been proposed as a better all-embracing title, but if one accepts the results of the transmission experiments in human volunteers done in various countries during the war years, there must be at least two distinct hepatitis viruses, one causing most of the epidemic infective hepatitis and the other most of the "homologous serum hepatitis." It is difficult to conceive how "homologous serum hepatitis" could be kept going among populations by inoculation alone, and we have also the suggestive evidence of FINDLAY and MARTIN [9] and of MACCALLUM,[10] that the virus may be present in the nasopharynx at some stages of the incubation period or early in the disease. In epidemic infective hepatitis we know the virus is also circulating in the blood-stream in the preicteric period when a donor may provide blood and cause "hæmatogenous hepatitis." MACCALLUM suggests that the viruses responsible for the two forms of hepatitis should be called hepatitis viruses A and B, and this seems a satisfactory way out of the difficulties. Whether these are distinct organisms or two strains of the same organism remains uncertain. There is some evidence that infection with virus B actually increases susceptibility to virus A, and it seems that a large proportion of adults in Great Britain are susceptible to virus B whereas there is a widespread immunity, in the adult population, to virus A.

A New Way with Poverty

THE poor-law stood us in good stead; according to G. M. TREVELYAN,[11] it probably spared us the equivalent of the French Revolution. No such regiment of beggars as swarmed in the streets of French towns under Louis XIV was seen in England after Tudor times: "the poor-law was meant to prevent them, and did prevent them by the only practical method, the relief of distress and the provision of work." Even the 1834 Act, which brought its own abuses, contained, as TREVELYAN says, the seeds of its own reform, and must be counted among the forbears of the new National Assistance Bill, the text of which was issued last week. Its immediate parents, however, were the Local Government Act of 1929 and the Beveridge report; and we may take some pride in the fact that the final stage of translating that report into laws is being taken before it is five years old. Public opinion has turned in a new direction during the past century; and the chief difference between the legislators who planned the 1834 Act and those who drafted the new Bill is to be found in the modern respect for the personal liberty of the poor. Its fundamental aim, explained in a white-paper,[12] is "to achieve the final break-up of the poor-law and create entirely new services founded on modern conceptions of social welfare." These services fall into two main parts. The relief of destitution is to pass out of the hands of the local authorities into those of a National Assistance Board, financed by the Exchequer, which will administer a State scheme for all needy people who are outside the national insurance scheme, or whose necessities are not fully relieved in other ways. To the local authorities, however, remains the task of providing residential accommodation for the old and infirm, and other people who need care and attention.

The only qualification for national assistance will be "need"—to be defined according to general standards in regulations approved by Parliament. Anyone over the age of 16 who is in need will be able to apply for assistance, and if the need is established he and his dependants will be helped. There will be no household means test: the resources of applicants will be considered jointly with those of their wives and husbands, but no account will be taken of the income of earning sons and daughters, though they will be assumed to be making an appropriate contribution to the rent and household expenses. This shows a new respect for the kin of the poor, who—whether grandfather, father, grandmother, mother, husband, or child—have been required since Elizabeth's Act of 1601 to maintain (if their means allowed) any old, blind, lame, or impotent person—a duty which must have kept many an old person from resting and young from marrying. The only liabilities now recognised are that of a husband to keep his wife and children and of a wife to keep her husband and children. The local officers who will deal with applications will be the relieving officers under a new name, for the same duties of giving emergency relief by night or day will fall to them. From their decisions there will be right of appeal.

It is assumed that few of those seeking assistance will be able-bodied persons of working age; but any such who decline or neglect to maintain themselves or their families may be refused help unless they attend a course of training or instruction, or go to a re-establishment centre. Tramps and vagrants—according to the *Times*, there were only about 1200 at the last count—may also attend such centres, and local authorities will be required to house them temporarily in reception centres. The National Assistance Board will be responsible for providing means by which people without a settled way of living "may be influenced" to lead a more settled life; but this is a very different approach from that of the old poor-

8. See *Lancet*, Sept. 20, p. 436.
9. Findlay, G. M., Martin, N. H. *Lancet*, 1943, i, 678.
10. MacCallum, F. O. Paper to the International Congress of Physicians, 1947.
11. English Social History, London, 1944.
12. Summary of the Provisions of the National Assistance Bill. Cmd. 7428. H.M. Stationery Office. Pp. 12. 3d.

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law, under which, TREVELYAN tells us, "the personal liberty of the poor was not a thing of which much account was taken"; and the only influences brought to bear on the idler, the unemployable, or the drunkard were the house of correction or the stocks.

Some of the most interesting provisions relate to the care of old people. The county and county-borough councils in England and Wales, and the county councils and large burghs in Scotland, are to provide board, lodging, and attendance, and such amenities as hot and cold water and laundry services, for all who cannot wholly look after themselves. Those who can afford it will pay a fixed standard charge for such residential care, and others will pay at least 21*s*. a week. Those with retirement pensions of 26*s*. a week will thus be able to meet the minimum charge with 5*s*. pocket-money in hand, and those with less will have their income made up to 26*s*. by the National Assistance Board. The principle of paying for residential care is important, for experience at the Hill Homes and elsewhere [13] has shown that payment makes all the difference to the self-respect of the residents. Local authorities will also be empowered to extend to the deaf and the crippled the same welfare services as they now provide for the blind, arranging, if they wish, for voluntary bodies to act as their agents for these purposes.

The numbers needing assistance are at present smaller than might be supposed. Since 1946, when pensions became payable at rates provided in the National Insurance Act, the number of applicants for assistance has fallen from 1,500,000 to 500,000. National assistance in its new form will take the place of unemployment assistance and the granting of supplementary pensions to widows and old people (now paid by the Assistance Board), domiciliary assistance to the blind, and outdoor relief under the poor-law (now paid by local authorities), and tuberculosis treatment allowances (now paid by local authorities at the cost of the Exchequer). It is estimated that the numbers transferred to the National Assistance Board would be 430,000 people on outdoor relief, 72,000 blind people receiving domiciliary assistance, some 500,000 widows and old people receiving supplementary pensions, and 30,000 people receiving unemployment or other allowances. The National Health Service will take over the 50,000 sick people now in poor-law institutions, and the 18,000 patients in mental hospitals; while the 30,000 children deprived of a normal home life will come under the child-care services of the Home Office. The healthy old people in the residential homes provided by local authorities will number some 40,000. Under this last heading it is thought that about 20,000 additional beds in residential homes will have to be provided, in the course of the next five years, for old people in England and Wales, and a further 3000 in Scotland. Some 60% of these beds will have to be in new buildings put up with the help of an Exchequer subsidy. As is pointed out in the financial memorandum attached to the Bill, "the rate at which it will be possible to provide these beds in new buildings cannot be foreseen," and it is unfortunate that the presentation of this Bill should coincide with an embargo on the building of houses and institutions of the kind it will require. If much of the fulfilment therefore lies in the rather distant future we may nevertheless rejoice in a reform which will do much to remove the indignities of poverty. Its realisation will make it easier, without hypocrisy, to see our nation as "a huge team of all sorts and kinds of people." [14]

13. See *Lancet*, 1947, i, 800.

Annotations

THE PANEL CONFERENCE

THE atmosphere of last week's Panel Conference was very different from that of a year ago. Then, negotiations for the increase in the capitation fee in consonance with the findings of the Spens Committee, had broken down, and war with the Minister of Health seemed imminent. The fiery cross had gone round, and resignations from N.H.I. service had been gathered in every county from almost all panel practitioners. The conference met in a mood of frustration and defiance. Fortunately a last-minute message from the Minister provided grounds for reopening discussions, and a compromise was eventually reached. Satisfaction with this achievement was naturally the keynote of this year's conference; and little criticism arose on the matters reported by the Insurance Acts Committee.

As was to be expected, the delegates demanded up-to-date information about the progress of the negotiations on the National Health Service; and Dr. Guy Dain responded with a statement. Between February and July, he said, detailed discussions had taken place between the Ministry's officers and five subcommittees appointed by the Negotiating Committee; the whole field of controversy had been covered, and no subject excluded from debate. The Negotiating Committee was to meet on Nov. 5 finally to agree on a summarised statement of all the arguments put forward during the discussions. This document was next to be presented to the Minister, who had already agreed to meet the committee on Nov. 11 and 12. The committee's document and the Minister's reply would later be printed and circulated to each member of the profession, and would be the subject of discussion in the British Medical Association's divisions preparatory to the calling of a special representative meeting of the B.M.A. Immediately after this meeting, doctors would be asked by plebiscite whether or not they were willing to take part in the new service.

Having accepted this statement, the conference passed on to discuss points of difficulty already arising in the establishment of the administrative machinery for the new service, in particular the failure of many health authorities to agree to coöpt medical men to the health committees to be set up under the 4th schedule of the Act. It agreed to the suggestion of Sheffield that the profession's representatives should press for an amendment of the Act which would make such coöption obligatory rather than permissive. Finally, it asked the chairman of the Insurance Acts Committee, Dr. E. A. Gregg, to speak on the probable future of the I.A.C., the National Insurance Defence Trust, and the Panel Conference itself. Dr. Gregg announced with confidence that though there is no statutory provision for a committee or a conference analogous to the ones that have so long represented doctors under National Health Insurance, the need for them will remain. It will be impossible, he holds, for the new service to be built or maintained without the help of such bodies, and he has no doubt that under one name or another new bodies will arise surprisingly like the old in function and perhaps even in personnel. The conference accepted this prophecy, and proceeded unanimously to elect its present chairman, Dr. J. A. Brown, to be chairman of the first conference to be called after the appointed day.

14. Sir Stafford Cripps. Broadcast of Nov. 2.

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THE THREE R's

Julian Huxley, in his foreword to a UNESCO report on fundamental education,[1] quotes Lincoln's words about the nation half slave and half free being unable to stand, and emphasises that the same applies to a world in which half the people lack the elementary freedom of the ability to read and write. Statistics show that illiteracy reaches vanishing-point in the countries of northern Europe (less than 1%), but in the British Army 20% of recruits during the war were found to be *semi-literate*; Italy, Spain, Portugal, and Bulgaria have illiteracy-rates ranging from 27% to 55%; Asia is fairly constant at 80–90% (except for Japan); and Africa has the highest illiteracy-rate of all, from 90% to 98% among the coloured people. As one might expect, the main features associated with a high rate of illiteracy are mountains and other obstacles, poverty, and over-population.

Various attempts have been made by countries all over the world to increase the numbers of those who can read and write. France, for example, uses the French language as a political tool in helping to grant freedom to the native people she rules. In the Union of South Africa, however, the technically trained coloured youth is up against the difficulty that only 1 in 100 stands much chance of getting a skilled job. The fine plans of the Chinese government since 1927 to reduce illiteracy have been upset by the eight years' war against Japan; but even so, the expenditure of some of the district governments on education has been as much as a third of the total budget. In India the chief physical difficulty is that only 15% of people live in towns or cities, compared with 79% in England and 51% in the U.S.A. Lenin's words apply aptly to India: "An illiterate man is outside politics and before he can be brought in he must be taught the alphabet. Without this there can be no politics—only rumours, gossip, tales, superstitions." Often the Indian asks: "Is it worth while for my children to be educated?" and decides in the negative. "Few Indians think education good in itself." Perhaps the most interesting section of the report is that dealing with the attempts of the U.S.S.R. to educate its people; some tribes had not yet emerged from primitive devil-worship and the vast mass were illiterate, though at the other extreme there were small groups of highly educated people. Russian is compulsory in all schools, but education is carried out in ninety different languages throughout the Soviet Union—a remarkable attempt to keep alive the different cultures of a vast land.

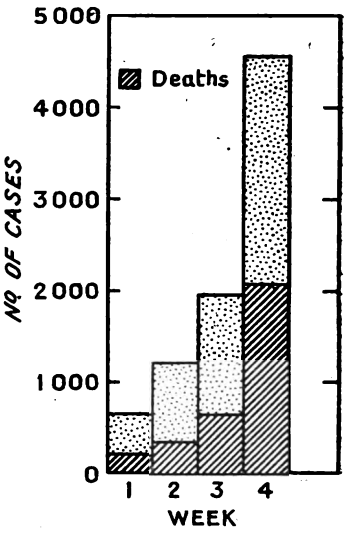
The report points out that even in illiterate areas ancient religions such as Islam, Confucianism, and Buddhism have preserved certain forms of education; but these will not serve for today, despite the dangers of uprooting the old ways of life: history provides many examples of civilisations which have snapped from sudden change in their culture. Writing from the standpoint of the anthropologist, Dr. Margaret Mead agrees that such nativistic movements as the American Indian ghost dance and the revival of Celtic languages may be regarded as expensive drags on the progress of human culture; but she herself seems to disapprove of this view. On the major problem of language the report favours simplification to ease translation from one to another. Sense aids such as films, records, radio, and maps should be used where possible; and emphasis is laid on offering not only the bare bones of literacy in a knowledge of how to read; people should be taught also why they read, and should be helped in deciding what to read.

How far can the West, with its greater power, afford to influence the Orient in fundamental education? Did Britain keep India from sinking through apathy and internecine strife, or will India, with the removal of Britain's inhibiting influence, raise its standard of living? The report quotes an old African woman as saying: "You Europeans think you have everything to teach us. If, as you say, we have been eating the wrong food all this time, cultivating our fields and rearing our babies the wrong way—why, we'd all be dead. But you see we are not."

1. Fundamental Education: Common Ground for All Peoples. UNESCO. H.M. Stationery Office. 1947. 7s. 6d.

EPIDEMIOLOGY OF CHOLERA

IN India upwards of 200,000 die of cholera each year; and in China the figure is probably larger. This estimate was made by Sir John Taylor at last Monday's meeting of the epidemiology section of the Royal Society of Medicine. Basically, he said, the problem of cholera is the problem of two endemic areas—Lower Bengal and the Yangtse valley. There may, however, be other minor areas of endemicity. From India cholera is disseminated by three principal routes. It may spread via Afghanistan to Persia and south-east Russia; but this route has not been followed for many years and it does not appear to be now a major danger. Secondly, it may spread via Iraq and Syria; and Iraq has been infected eight times in the present century. Thirdly, it may spread by the Red Sea to Egypt. The common source of infection in Egypt used to be the annual pilgrimage; this was the cause of the 1902 epidemic when 34,000 died. The pilgrimage was again infected in 1907, 1908, 1911, and 1912. Since then, however, it has not been infected owing to the effectiveness of quarantine measures. Infection is maintained by cases, convalescents, and close contacts; and steps to prevent spread must be related to the infectivity of each of these groups. The incubation period may be taken as about five days, so by the sea route a case infected in India will manifest itself before reaching Suez. Patients excrete the cholera vibrio for about five days, though occasionally excretion may continue up to thirteen days; close household contacts excrete the organism usually for about five days, but occasionally up to nine days. Convalescents and contacts will thus be clear by the time that Suez is reached; it is unlikely, moreover, that recent convalescents would pass the routine examination at the embarkation point. There remains, however, the risk of the missed case on shipboard. With normal air traffic there is no great risk of infection being introduced; there have been suspected but no proved cases. Positive contacts might, however, arrive by air, and the present refugee traffic may increase the risk. Even so there is little danger that infection introduced into this country would spread.



Cases and deaths in Egypt from Sept. 22. A falling incidence was reported last week (*Times*, Nov. 4).

Sir Leonard Rogers, F.R.S., prophesied that the Egyptian outbreak would now die down though it might come to life again next year. The real danger, he concluded, lies in the Punjab epidemic; for there is grave risk that next year it may spread to Russia.

Public-health measures were discussed by Dr. Melville Mackenzie, who said that surveillance was to be imposed on air passengers who had spent nights in Egypt. The

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sea passage took about two weeks, so imported food was no problem. Some countries, he noted, were placing unreserved confidence in vaccination. For Egypt mass vaccination, with material made in different countries by differing standards, was a difficult undertaking; a universal standard was required.

Mr. P. Bruce White described the work leading up to the identification of the three types of cholera vibrio—original, intermediate, and variant. These types were, he said, variants of a single species; but though they were transmutable, mixed infections were not found. It was not absolutely certain that the vibrio was the cause of cholera: in some epidemics only non-agglutinable vibrios were isolated in about 30% of cases. He had been impressed by the consistent absence of laboratory infection. Did the vibrio lose some virulent factor in culture?

"CORRECTIVE EXPERIENCE"

VERY few doctors now deny that more or less expert psychological treatment is necessary for some patients: controversy has shifted to the choice of method and the right solution to the problem created by the cost and lengthiness of psychotherapy. Psycho-analysis, to take the salient instance, could never be afforded to the majority of neurotic children and adults (even if it were of proved efficacy in making them healthy) unless we came to regard it much as we regard education or the water-supply. Recognition of this dilemma has led on the one hand to energetic experiments in group treatment—taking a leaf out of education's book—and on the other hand to efforts to shorten psychotherapy without emasculating it. Among psycho-analysts, abbreviated or simplified treatment has had short shrift since the defection of Adler and Stekel, the ill-starred attempt of Ferenczi, and similar misadventures caused anything but "full" analysis to be classified with hypnosis, persuasion, and other—more or less despised—alternatives to the rigorous analytic procedure. An enterprising school of analysts at Chicago led by Dr. Alexander have of late years had the courage to challenge this, and their standpoint and achievements are clearly stated in a collective report.[1] Its keyword is "flexibility": so much so, that at the end of his introduction Dr. Alexander says roundly that few if any cases require strict adherence to standard psycho-analytic technique throughout their course of treatment. He attacks as doctrinaire and harmful the standard assumptions about the importance of infantile happenings in determining later neurosis, and the orthodox refusal of analysts to advise the patient about his daily life. Psycho-analytic treatment has sometimes been unjustifiably prolonged, he holds, and interviews have been too frequent; too much emphasis has been laid on recovery of forgotten memories, which is not essential to recovery—"merely remembering an intimidating or demoralising event does not change the effect of such an experience, only a corrective experience can undo the effect of the old. This new corrective experience may be supplied by the transference relationship, by new experiences of life, or by both."

Such challenges to widespread psycho-analytic practice and theory would have little weight with orthodox analysts unless supported, as they are here, by case-records and respectable analytic experience. Dr. Alexander and Dr. French hold, with some justification, that their methods are a logical continuation of those initiated by Freud's discovery that the "transference" is the dynamic agent of the curative process. The test of good treatment, however, does not lie in historical continuity or doctrinal soundness, but in the number of patients who are made well; and on the information given the Chicago psychotherapeutic methods seem to stand this test. The work described is important not only to psycho-analysts but to psychiatrists generally, and especially to those concerned with deciding how the people who need psychotherapy may get it in a National Health Service.

1. Psychoanalytic Therapy: Principles and Application. By FRANZ ALEXANDER, M.D., and THOMAS MORTON FRENCH, M.D., with staff members of the Institute for Psychoanalysis, Chicago. New York: Ronald Press. 1946. Pp. 353. $5.

CHEMOTHERAPY OF CANCER

To anyone with experience of malignant disease, it is astonishing to see the melting away and total disappearance of a tumour as the result of X-ray treatment. The figures for cure by radiotherapy of cancer of the breast, cervix, and anterior portion of the tongue, which equal those achieved by surgery, have inspired radiologists and surgeons to investigate the laws governing this destructive capacity and to adapt the physical means to these laws.

That the treatment of cancer by chemical methods is equally worthy of further study was shown by last week's meeting of the Royal Society of Medicine's section of medicine. Prof. Alexander Haddow reminded his listeners that to sceptics attempts at chemotherapy might seem absurd, since the cancer cell was only a modified form of the normal; the malignant cell was stable and there was no real evidence of reversibility. The real difficulty was to overcome the energy barrier between the two states; the difference was not structural. By œstrogens, urethane, and β-chlorethylamine cancer might be controlled or modified, though not cured. It was noteworthy, Professor Haddow said, that the value of these drugs had been appreciated thanks to observation for its own sake in man; their effectiveness would not have been guessed from animal experiment alone.

Mr. E. W. Riches reported that 90% of his cases of prostatic cancer treated with œstrogens showed signs of response: 87% were alive at the end of one year, 29% at the end of two, 19% at the end of three, and 5% at the end of four years. If metastases appeared during treatment, the dose should be increased; side-effects were not an indication for stopping treatment. Dr. Edith Paterson referred to the use of urethane in leukæmia. Its effect, she said, is similar to that of X rays. In myeloid leukæmia the cell-count is reduced and the hæmoglobin increased; and in both myeloid and lymphatic leukæmia cell differentiation appears to be increased. Mr. Eric Boyland, D.SC., urged the need for further trial to establish the dosage of chemotherapeutic agents; it would be wrong to follow blindly the dosage adopted in the original trials. Using β-chlorethylamine for the treatment of the reticuloses, Dr. Jean Watkinson had observed symptomatic improvement only in Hodgkin's disease. Dr. O. H. Warwick spoke of the symptomatic relief obtained by the treatment of bronchogenic carcinoma with nitrogen mustards.

That the interests of the patient must be the first consideration in the choice of treatment—whether by surgery, X rays, medical care alone, or one of the newer drugs—was apparent from each speaker's testimony. One expressed the view that the price, in suffering, for mere palliation may well be too great. Professor Haddow deprecated any attempt at assessment of the value of chemical treatment at this stage, claiming that the observations ought to be pursued for their own sake. It is clear, however, that the œstrogen treatment of prostatic cancer has already justified itself, if only by reducing (as Mr. Riches demonstrated) the alarmingly high mortality in the first year of disease.

B.M.A. NUTRITION INQUIRY

THE council of the British Medical Association has decided to appoint a committee to consider "problems of nutrition in this country, including current nutritional standards." The membership will be announced shortly.

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Special Articles

THE CHOLERA EPIDEMIC IN EGYPT

Mode of Spread

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El Korein, where the present epidemic of cholera started, is a town in the Sharkieh province (fig. 1) with an area of about 40 sq. kilometres. Its main source of wealth comes from its date-palms, and it draws its water-supply from shallow wells. Its inhabitants number 15,000, to which must be added about 6000 immigrants from all parts of the country, settled there to work in the British camps, and a floating population of about 9000 persons during the date season who stay there two or three months to buy and trade in dates.

Of this floating population very few have remained in the town; the rest ran away in the early days of the cordon and played an important part in disseminating the cholera, especially in Dakahlieh province. Of the settled immigrants working in the British camps, only about a quarter escaped and spread over the country.

There is also a third group of immigrants, formed of Bedouin Arabs coming from the east to collect dates and press them into cakes which they carry back to their home country. These are very few and are not an important element in disseminating cholera in Egypt; nor did they introduce the disease, for they had been dwelling in that area for more than two months before the outbreak.

SPREAD BY DATES

El Korein grows about 250,000 date trees, producing about 12,000 tons of dates. It is the main source of supply of dates to the provinces of Sharkieh, Dakahlieh, and Galoubieh. Much of the harvest had already been sold before the epidemic began, but the rest was not properly taken care of and could thus continue to be sold outside, particularly at the beginning of the epidemic. Date cakes find a market all over the country because they can be kept a long time.

It has been proved in Iraq that the cholera vibrio cannot live in compressed dates, owing to the high concentration of sugar; but it can live on the skin of ripe dates for some time.[1] In fact dates have long been implicated in the transmission of cholera. A report of a medical commission sent to investigate the first cases of cholera at El-Salhieh in the 1895 epidemic stated: "Clinical and bacteriological examination has proved that the disease prevailing at El-Salhieh is a gastro-enteritis due to the overeating of dates and salted fish. . . ." [2]

Thus two factors of great importance in the spread of cholera appear to be, first, the settlers, most of whom come from Dakahlieh and are connected with the date business, a few coming from the rest of Egypt; and secondly, the dates, which are sold all over Lower Egypt, especially in Sharkieh and Dakahlieh. In view of the slackness in the first days of the cordon established first round El Korein and later round Sharkieh province, the many evasions and smuggling through the fields, the numerous land communications between Sharkieh and its neighbours, and river communications between Sharkieh and Dakahlieh through the Manzaleh Lake, &c., it is not surprising that the cholera spread as rapidly as it did to the latter province (fig. 2).

A review of the earliest cases showed that nearly all were said to have come from Sharkieh. An inquiry in the region of the Bahr El Seghir canal, from which most date traders come and which is the most important market for El Korein dates, fully confirmed this view. For instance, an old woman who lived at El Korein with her grand-daughter contracted cholera and was isolated there. She succeeded, however, in sending her grand-daughter back to her mother in Demouh with a present of dates on Oct. 1. After 24 hours the mother was affected with vomiting, and she died the same evening. The girl was not affected.

This case was not mentioned in the official records (the first case recorded occurred on Oct. 5); but, if the diagnosis of cholera was correct, did the girl or the present of dates carry the disease? This is difficult to answer, especially since the contacts of the first cases at El Korein were not carefully isolated and did not have their stools examined. These precautions were taken only in the big cities, the authorities being content in the smaller towns and villages with considering all the inhabitants as contacts and isolating each community with a cordon, which unfortunately did not have the desired effect.

In Dekernes on the Bahr El Seghir, an important market for El Korein dates, a tradesman with a son-in-law at El Korein bought a car-load of dates from there on Oct. 2 and sold them in the black market because of the ban on the sale of

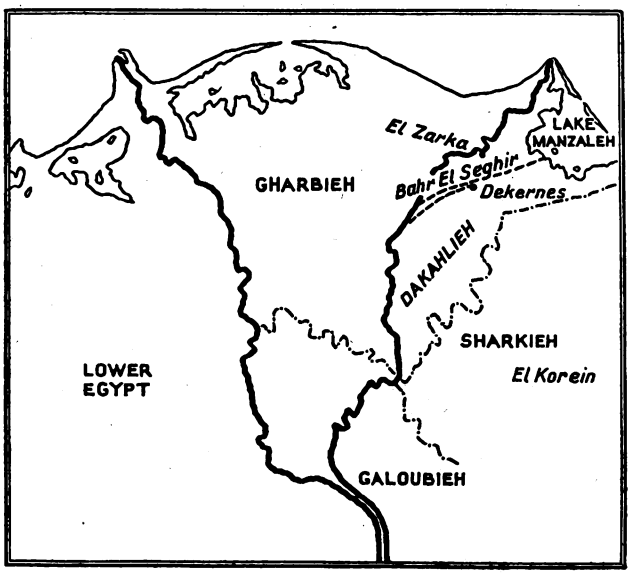

Fig. 1—The cholera area.

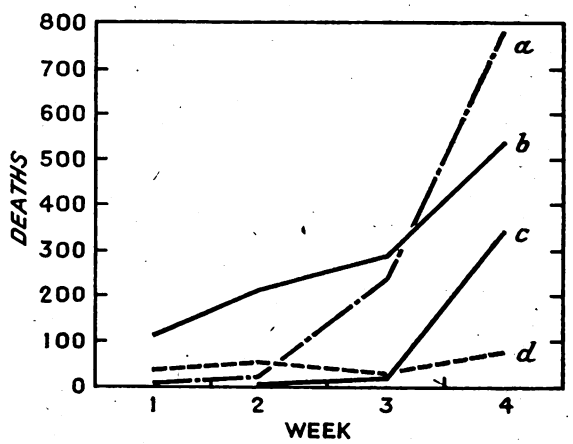

Fig. 2—Deaths in four neighbouring provinces: (a) Dakahlieh (population 1,400,000); (b) Sharkieh (population 1,350,000); (c) Gharbieh (population 2,400,000); (d) Galoubieh (population 687,000). Dakahlieh and Galoubieh are both adjacent to Sharkieh (see fig. 1). If cholera had spread directly, they would have been affected to same extent.

1. Information communicated at the special meeting of the Royal Egyptian Medical Association on Oct. 15, 1947.

2. Wakil, A. W. *J. Egypt. med. Ass.* May, 1938.

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dates. Fearing they might get spoilt, he sold them at a quarter of the usual price, thus tempting many fellaheen. His daughter fell ill on Oct. 6 with cholera, the first victim of the disease in the town.

In the neighbouring village of Abu Naser the first case occurred on Oct. 7 (recorded on Oct. 8), and it was proved that the patient's father had bought 10 lb. of dates on the previous day from Dekernes. Since the omdeh (mayor) had forbidden the admittance of strangers some days beforehand, it is likely that the dates were the source of infection in this case too.

The second case in the same village appeared on Oct. 9. The patient had had no contact with the first case, but her husband was also said to have bought dates from Dekernes.

The omdeh of Miniet El Nasr, which is in the middle of Mit El Kholi Momen, Mit Timma, El Nazl, and Bagalat, all of which rely on the Miniet El Nasr market for their dates, fairs, &c., told us that the cars loaded with dates, finding the road to Miniet El Nasr closed, escaped to the other villages. The official records show that the cholera started in Mit Timama on Oct. 6, in El Nazl on the 7th, and in Mit El Kholi Momen, Bagalat, and Miniet El Nasr on the 10th.

In the neighbouring villages, which lie near the Nile and buy their dates from the region of Damietta, there were very few cases before Oct. 13. The towns near the Nile, from El Zarka (north of which exposure occurred through Lake Manzaleh) to Mansurah, were also either spared or very slightly and only recently contaminated.

Of another group of six closely set villages which rely on two different sources for their supplies of dates, the three supplied from Dekernes were first affected on Oct. 7 and 8, while the remaining three, relying on Sherbin, which gets its dates from Damietta, had only one case, on Oct. 13.

These facts throw strong suspicion on the dates of El Korein, which seem second in importance only to the settlers who escaped from that region, and it is the more unfortunate, therefore, that the dates were not destroyed at the outset and were allowed to percolate to other places.

PELLAGRA AND CHOLERA

The importance of these agents should not lead us, however, to overlook two other factors that may have helped to disseminate the epidemic in Dakahlieh, not to mention the general poverty, dirt, and ignorance which are not more extensive in Dakahlieh than elsewhere.

The first of these factors is the high absolute humidity in Dakahlieh, which was studied by Dr. Halawany and reported on before the special meeting of the Royal Egyptian Medical Association.[1]

The second needs some explanation. It is well known that gastric acidity plays an important rôle in the protection against cholera, and that many parasitic diseases, especially those followed by pellagra, diminish gastric acidity. Now these diseases are rife in Dakahlieh, and pellagra is very common.

When I visited some tents in the isolation hospital at El Korein I was struck by the number of cholera patients showing a pellagrous rash. Time did not allow me, however, to look for other cases or for latent pellagra. In the Dekernes Isolation Hospital many cholera cases with pellagra were also seen. In Kafr Abu Naser, where I carried out a parasitological survey last year, out of 10 cholera patients 4 were pellagrins and 8 had some parasitic infestation, bilharzia, &c. In Azazna, where a similar survey had been carried out, the only persons to be attacked with cholera up to Oct. 13 were likewise pellagrous. It may be added that almost every cholera patient was uneducated, and most of them were the victims of malnutrition, poverty, and dirt.

WELLS

The main water-supplies have not up to now played any apparent part in the spread of cholera; but the wells which are in general use in El Korein and in most villages of Sharkieh are mostly shallow and badly constructed, and these have been partly responsible for spreading the infection.

Thus, in El Malakin, a farm community near El Korein with 500 inhabitants, there is a well which supplies the whole population because it is the only one containing soft water. This well is formed of a big mud funnel with an earthenware vessel at its bottom to collect subsoil water. It is said that a woman who escaped from El Korein fainted while washing her clothes there and vomited in the well. Next day 70 people had vomiting and diarrhœa. On the same day (Sept. 29) the medical officer of health filled the well and isolated 11 patients. He isolated a further 17 on the 30th, 6 on Oct. 1, 4 on the 2nd, 2 on the 3rd, and 4 on the 4th. No new cases appeared later—i.e., after about 10% of the population had been affected—so the total was 44 cases, with 22 deaths.

In Almiseed, another village in Sharkieh, a deep well had been bored by the Ministry for Social Affairs but had not yet been used. Six cases appeared between Sept. 24 and 30. On the 30th orders were given to open the new well to the exclusion of the others. Only one case was reported next day, and the village has since remained free.

The health authorities are now showing great activity in boring sanitary wells in Egyptian villages wherever the sweetness of the deep underground water allows it.

ANTI-CHOLERA MEASURES IN EGYPT

FROM A CORRESPONDENT IN EGYPT

THE last occasion on which cholera was epidemic in Egypt was in 1902, when it appeared in a group of pilgrims on their way back from Hedjaz; since then there have been only 5 cases, in 1918. The epidemic which started in July, 1902, declined in October, and by January, 1903, all sporadic cases had ceased. The total number of declared cases in that epidemic was 40,316, with a fatality-rate of 85% (34,595 deaths).

The present epidemic started in Egypt on Sept. 22, at El Korein, a village in the Sharkieh province near the British camps on the western bank of the Suez Canal. On the previous day, 3 cases of suspected "food-poisoning" coming from that locality had been admitted for treatment in the hospital of a neighbouring town.

Though cholera had almost disappeared from Egypt for 45 years, and though this was not the season of the return of pilgrims from Hedjaz, which had been the essential source of most Egyptian cholera epidemics in the past, cholera was suspected by the health officer, and without waiting for bacteriological confirmation all practicable measures were immediately taken to wipe out the epidemic.

All land and river communications were stopped in the affected region, and isolation camps for the patients, disinfection stations, and guard posts to keep watch on the principal water sources were erected in great haste.

Contacts were vaccinated from the stores of cholera vaccine kept in the Egyptian Institute of Serum and Vaccine for the pilgrims who were on their way to the Holy Lands this year. The annual production of vaccine is adjusted to satisfy the needs of three times the number of expected pilgrims, which is usually about 20,000 each year. The British Army also offered help by volunteering to spray the dwellings of the contaminated villages with D.D.T., and by providing the isolation hospitals erected there with sterilised water.

On the second day bacteriological confirmation came, and the Egyptian government immediately allocated for the campaign half a million Egyptian pounds, a sum doubled three weeks later. At the same time it informed all international authorities and banned pilgrimage to prevent spread of the disease to neighbouring countries.

These energetic measures, however, did not prevent the epidemic from spreading sporadically to the neighbouring regions, helped by the poverty, ignorance, and bad hygiene prevailing in the countryside, and by the high rate of absolute humidity this year.

Cairo, Alexandria, and the other big cities, largely escaped infection owing to their better water-supplies and hygienic conditions. Strict measures were taken

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there for food control, general cleanliness, and to combat flies by D.D.T. sprays from special aeroplanes. These measures were helped by the fact that the urban population is better educated and more coöperative. Only sporadic cases appeared in these cities, and most of them actually came from contaminated areas. In Upper Egypt, also, only scattered cases appeared.

A huge campaign is being carried out to vaccinate the whole population of Egypt, now that the local production of vaccine, in addition to the quantities from England, Switzerland, the U.S.A., Russia, and neighbouring Arabian countries, allows it. Nearly 5 million people have already been vaccinated, most of them with a single dose of 1 ml. (8000 million organisms).

FACTORS IN DISSEMINATION

The scattered distribution of the early cases gave the epidemic the appearance of being mostly a contact epidemic, where carriers and patients play the principal rôle in dissemination, either directly or via flies and food contamination. Fortunately, the repeated examinations of water done so far, and the distribution of cases, have not revealed any grave contamination of the large water-supplies.

The work of Sir Leonard Rogers in India on the relation between cholera epidemics and the degree of absolute humidity, which finds confirmation in the previous Egyptian epidemics, led authorities on the subject at a special meeting of the Royal Egyptian Medical Association, held on Oct. 15, to forecast at least a temporary reduction in new cases by the end of November, when the humidity-rates fall below the minimum necessary for the spread of the disease. A return, however, is feared next May, unless it can be forestalled by the search for carriers in the infected areas and repeated vaccination in good time.

The source of the epidemic is still obscure, and no official statement concerning its discovery has been made in Egypt. But many first-hand observers think they can trace the origin of the infection to Egyptian labourers infected by aeroplanes coming from India to British Army aerodromes, where these labourers work. It seems that some of the first cases were actually engaged in these airfields, which, until Oct. 6, were not under the control of the Egyptian Quarantine Department. There is also a coincidence between the Egyptian epidemic and that which started on Aug. 15, 1947, in the Punjab after its partition between Pakistan and Hindustan and the migration of about 5 million persons that followed it. In support of this view they point to the return from India of British troops who used the Suez Canal region as a quarantine station and remained there with their Indian retinue for two weeks before departing for England. British authorities, however, deny that there is any relation between the present epidemic and their Forces. It has certainly been established that the epidemic is in no way related to pilgrimage.

The number of reported cases, including suspects, from Sept. 23 to Oct. 21 reached 8308 with 3230 deaths (39%).

It is too early to express an opinion on the effect of the newer methods of treatment—most fatal cases were too ill and toxic on admission to hospital for recovery to be possible—but experience with sulphonamides has been on the whole disappointing and rehydration seems to remain the mainstay of treatment. Plasma has been used when the blood-proteins were under 4·5 g. per 100 ml. The value of vaccination seems, however, to be fully confirmed. In the Abu Zaabal prisons, with a population of 3751, 78 cases appeared before vaccination was started (i.e., 5·5 per day); during the vaccination period this fell to 2·4 (12 cases), and then no further cases appeared. In Turah prison, with 8720 inmates, 20 cases appeared before vaccination was commenced and none afterwards. Among the whole population of the prisons in infected areas (about 12,000), the morbidity fell during the vaccination period to half the prevaccination rate, and the case-mortality of 30% fell to 0; no new cases appeared after the sixth day following vaccination.

SCOTTISH REGIONAL HOSPITAL BOARDS

THE Secretary of State for Scotland has now set up hospital boards for the five regions of Scotland which were defined last June.[1] He has selected the members after consultation with the interests he is required to consult under the Act, including the universities, organisations representing the medical and nursing professions, local health authorities, and voluntary hospitals. The total number in each board varies from 18 to 33. A third of the members will retire each year, and the following list shows the names printed in three groups: (*a*) those retiring in March, 1950; (*b*) those retiring in March, 1951; and (*c*) those retiring in March, 1952. The chairmen will hold office till March, 1951. The names of members of the medical profession are shown in bold type.

NORTHERN REGION

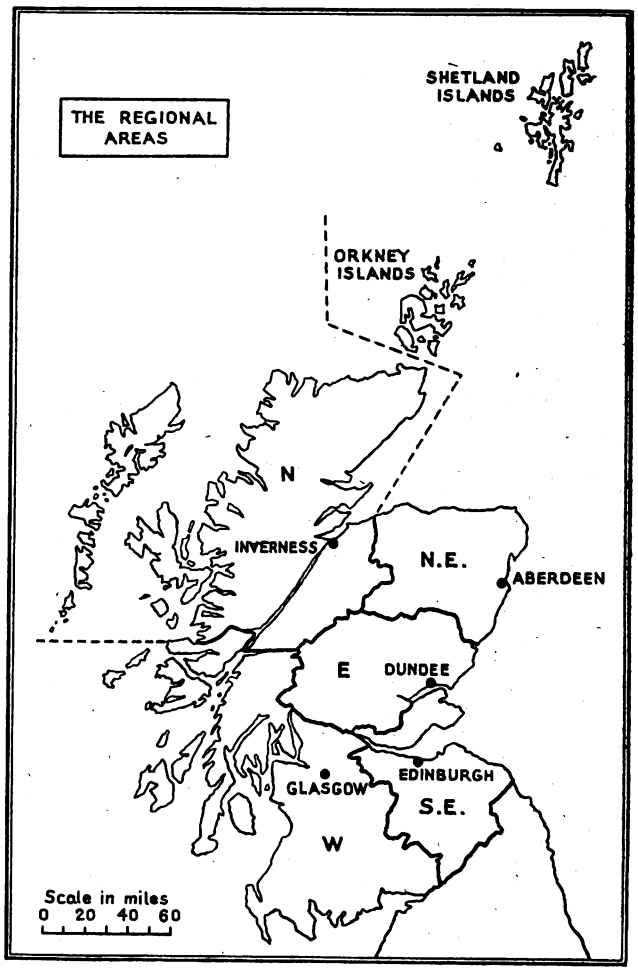
Chairman: Donald Macpherson.

(*a*) Colonel the Hon. I. M. Campbell, D.S.O.; Miss M. B. Clyne; Robert Gilbert; **I. H. Maciver,** M.B.; Rev. Father Neil MacKellaig; D. A. Plowman.

(*b*) **A. J. C. Hamilton,** F.R.C.S.; Rev. I. M. MacRury; Mrs. Macleod of Macleod; Norman Robertson; Thomas Scott.

(*c*) **J. R. Anderson,** M.B.; J. S. Banks; Norman MacIver; A. Mackintosh; **William McWilliam,** F.R.F.P.S.; **B. Soutar Simpson,** F.R.C.S.E.

1. *Lancet*, July 5, p. 28.



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NORTH-EASTERN REGION

Chairman: Mrs. **May Baird**, M.B.

(*a*) **A. Greig Anderson**, F.R.C.P.; Bailie **W. J. L. Dean**, M.B.; **D. G. Gordon**, M.B.; James Hay; Miss Bell Jobson; Fred **Martin**, C.B.E.; Robert Ollason.

(*b*) Prof. **David Campbell**, M.C., F.R.F.P.S.; Prof. **John Cruickshank**, C.B.E., M.D.; Rev. G. A. M. Dickson; A. Fraser; Miss F. E. Kaye, S.R.N.; Prof. **D. R. MacCalman**, M.D.

(*c*) Prof. **R. S. Aitken**, F.R.C.P.; Captain J. S. Allan, D.L.; James M. Burnett; J. Roy Campbell; Alexander Lyon, D.S.O., D.L.; **I. H. McClure**, O.B.E., F.R.C.S.E.; Mrs. **Helen Taylor**, M.B.

EASTERN REGION

Chairman: Treasurer William Hughes, O.B.E.

(*a*) **A. Allan Bell**, F.R.F.P.S.; J. R. Christie; R. A. L. Duncan; Miss Ann Graham; James Lawson; Mrs. A. L. Matthew; **J. D. Saggar**, M.B.

(*b*) Provost William Coull; D. F. Craig, J.P.; Miss **Margaret Fairlie**, F.R.C.O.G.; Prof. **Adam Patrick**, F.R.C.P.; Lewis F. Robertson, M.B.E.; Rev. A. Wylie Smith.

(*c*) Mrs. Agnes Allan, J.P.; T. M. Ferguson, O.B.E., J.P.; Prof. A. D. Hitchin, M.D.S.; William O'Neill, J.P.; James E. Prain; **George Rankine**, M.C., M.B.; W. J. Ross.

SOUTH-EASTERN REGION

Chairman: **J. R. C. Greenlees**, D.S.O., M.B.

(*a*) James Black, J.P.; Prof. **J. C. Brash**, M.C., F.R.C.S.E.; Miss J. J. Ferguson; Sir **David Henderson**, F.R.C.P.; Ben McKay; Miss I. McNeill; **Andrew Simpson**, M.B.; Miss E. Stirling; Sir **Henry Wade**, C.M.G., D.S.O., F.R.C.S.

(*b*) J. Allan; Bailie J. G. Banks, J.P.; **R. W. Craig**, O.B.E., M.D.; Lady Fraser; R. K. Henderson; Prof. **T. J. Mackie**, C.B.E., M.D.; Miss M. C. Marshall, O.B.E., A.R.R.C.; David **Martin**.

(*c*) O. A. Cunningham; W. P. Earsman, J.P.; **I. Simson Hall**, F.R.C.S.E.; **W. F. T. Haultain**, O.B.E., M.C., F.R.C.O.G.; Sir Humphrey Lindsay, D.S.O.; James McKelvie, J.P.; Prof. **Sydney Smith**, C.B.E., F.R.C.P.E.; John Sneddon; Major E. G. Thomson, M.C.

WESTERN REGION

Chairman: Sir **Alexander Macgregor**, O.B.E., F.R.F.P.S.

(*a*) **J. Bruce Dewar**, F.R.C.S.E., J.P.; James Finlay; R. McCracken; Andrew McGroarty; Miss L. D. F. McIntyre; Bailie S. P. McLaren; The Hon. Mrs. Maclean of Ardgour; **Angus MacNiven**, F.R.C.P.E.; **G. H. Stevenson**, O.B.E., M.C., F.R.F.P.S.; J. Stewart, J.P.; **J. H. Wright**, F.R.F.P.S.

(*b*) L. S. Blanche; Prof. **T. Ferguson**, M.D.; Rev. J. A. Fisher; Prof. **C. F. W. Illingworth**, C.B.E., F.R.C.S.E.; James Jack; Miss J. D. Jolly, S.R.N.; **George MacFeat**, O.B.E., M.B.; Bailie A. C. Manuel, J.P.; G. L. Peacock, J.P.; J. E. Russell.

(*c*) William Baxter; John Dunlop; Provost E. Fyfe, M.B.E.; Bailie Edward Lawson; A. S. MacLellan; **Alexander Miller**, F.R.C.S.E.; Provost C. Minihan; A. Moncrieff Mitchell; William Reid, J.P.; **Alex. Watt**, L.R.C.P.E.; Prof. **G. M. Wishart**, F.R.F.P.S.

TOXICOLOGY RESEARCH

THE following have been appointed by the Medical Research Council to serve on a new committee to advise and assist them in the promotion of research in toxicology, with particular reference to industrial hazards:

Prof. G. R. Cameron, F.R.C.P., F.R.S. (chairman); Prof. J. H. Gaddum, M.R.C.S., F.B.S.; Dr. Donald Hunter; Mr. F. C. MacIntosh, PH.D.; Dr. E. R. A. Merewether; Prof. R. A. Peters, M.D., F.R.S.; Mr. J. Davidson Pratt, B.SC.; Dr. J. R. Squire; Mr. J. Walker, D.PHIL.; and Dr. J. M. Barnes (secretary).

For carrying out experimental work within the field covered by the committee, the council have recently established at the Chemical Defence Experimental Station at Porton, Wilts, by arrangement with the Ministry of Supply, a new Toxicology Research Unit under the direction of Dr. J. M. Barnes. For clinical investigations in this field the council already have their Department for Research in Industrial Medicine, at the London Hospital, under the direction of Dr. Donald Hunter, and their Industrial Medicine Research Unit, at the Birmingham Accident Hospital, under the direction of Dr. J. R. Squire. In appropriate circumstances, research in the subject may be promoted by the council elsewhere, either within their own staff organisation or by means of grants to independent workers.

In England Now

A Running Commentary by Peripatetic Correspondents

JOY at the preservation of Parliament is more intense in our part of Sussex than anywhere else. The villages give themselves up to thanksgiving on successive evenings from Nov. 1; and the bonfires, like the fuel shortage, get bigger every year. Through the zeal and devotion of Ronnie and Brian Parks, and the use of their father's tractor for collecting wood, the formerly domestic celebrations in the field next door have now become the chief annual event of the Town Row Social Club, attended by no less than four policemen, with the fire-brigade in the offing.

Town Row means the Valley of the Farms; and from this valley, at dusk last Saturday, the fancy-dressed procession, encouraged by the Wadhurst Town Band, made short musical ascents for refreshment on neighbouring hills, returning occasionally to the lower altitude of the Railway Arms. Eventually, 1½ hours late, it arrived at the final scene of operations, headed by Ronnie and (I'm proud to say) our second boy Duncan, home for half-term and bearing a flaming torch. Among the vehicles behind were a decorated timber-tug carrying about 40 children; a curious van, open on both sides to display a household interior with a warming-pan on the wall and a kettle on the hob; and the Guy himself, on a tricycle chassis complete with rear light. Mr. Shinwell? Not at all. Guy Fawkes himself, in period costume, twice life-size, and a very model of sallow black-bearded villainy.

With the aid of Mr. Parks as Master of Ceremonies—a title we pardonably misheard at first as Marquis of Abergavenny—the beacon, a fourteen-foot cube of logs and bracken, burst into flame; while the announcer in Mr. Redman's motor-car burst into appropriate song, which despite his efforts remained a solo. (He was good on packing up our troubles; but somehow the atmosphere of *The Road to the Isles* suffers a bit in Sussex when the original unfamiliar words are replaced by "Oh . . . I titety-itey-titey-itey-I.") As time went on, the vast fire sent sparks hundreds of feet into the air to descend on the new thatch of our Wimpole-street psychologist; but we were asked not to throw fireworks at the band. Little bogus old men danced wildly in the wild flamelight; a rather highly coloured WREN, with H.M.S. *Spiv* on her hat, took a collection for something presumably naval; and a stranger accused our Mrs. Parks of cruelty when she tried to catch and rescue Brian's pet ex-lamb (Mary), which didn't seem to be enjoying itself. She was quite successful, however, in rescuing the Police, who went quietly after her for a Slow One in the house. The fireworks (£25, only don't tell the Americans) were terrific; but soon after 10.30 and God Save the King we thought it time to recall our party of seven boys (not all ours really) to break their 6½ hours' fast. The youngest, whose proper bed-time is 6.15, said to me: "Can we please go out after tea and pick up the firework cases?" Which proves (to anyone who doesn't know) that in the young and ardent the Internal Clock does not always keep good time.

I am glad to report that the Guy was deemed too good to sacrifice. But it had been an anxious evening for him, and he tottered a bit as he disappeared down the lane, with his rear light still burning.

* * *

Plain medical men attending a chemicopharmacological conference are likely to be a bit bewildered. One we attended a few weeks ago brought home to us sharply the complexity of the basic sciences on which modern therapy rests. Much of this spade-work is unintelligible to those whose instruction in chemistry was merely an incidental of medical training, and badly done at that. Our minds flew back to the tedious lectures by uninspired scientists who regarded the teaching of medical students as an unfortunate necessity. But the time lapse was too great, and the most we could do was to show a somewhat dazed interest in what was going on.

The chemists "hogged" the blackboard, covering it with their hieroglyphs. In the maze-like structures depicted some old and simple friends such as benzene rings and amino groups appeared from time to time, but only as the cornerstones of something incredibly

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complex. Occasionally the fascination of their subject gripped the drawers and they would pass into a dream world of their own, rubbing out a side-chain here and adding one there, substituting one key element for another in an attempt to perfect their scientific architecture, while their commentary degenerated into a low muttering delirium intelligible only to the initiated in their immediate vicinity—and, I fancy, not always to them.

The pharmacologists were a bit nearer reality, and mercifully left the blackboard largely alone. They told of their guineapigs, rats, dogs, and cats; they described the ingenious devices invented to prove their theories, and they aired other theories which still lacked confirmation, thus prompting little discussions tinged with polite disbelief—for what is more controversial than a pharmacological theory?

The overall impression I gained was that modern chemotherapy is on a very sound footing. Much of the painstaking research may at first sight appear to have little practical application but few things can be better justified. If the inquiring mind is allowed a reasonable freedom, if it is not restricted by soul-destroying routine investigations, and if results are interpreted with proper caution then the opportunities for good are immense.

* * *

Yesterday morning I stepped out of my bath and was standing quite still on the mat, looking at something through the open window, when I was struck suddenly by an agonising pain in the small of my back As on three out of the four other occasions when this calamity had befallen me, I fell to the floor and lay there helpless; it was half an hour before I could even reach the bell-pull to summon help.

I was rescued by my devoted Swiss maid, Lyddy, who fetched Henri the porter and her two sisters. With Lyddy circling round giving advice, they helped me across the corridor to my room where I was put to bed. Lyddy hovered about the foot of it for a while, then all at once she stopped and pointed an accusing finger at me. "It was the Hexenschuss!" she announced. "The what, Lyddy?" I asked weakly. "The Hexenschuss, sir, *the witch shot*"; and I think a suspicion crossed poor Lyddy's mind, good friends though we are, that if I had really been as nice as she thought this would never have happened.

Could any other name more aptly describe the fiendish suddenness with which these attacks begin? And in these primitive Swiss valleys, where superstition is rife and no peasant dare venture out of his chalet after the Angelus has sounded, witchery seems as reasonable an explanation as the prosaic and controversial prolapsed intervertebral disc.

* * *

In the bad old days before 1939, N.H.I. certificate books were just too sensible and compact for words. "First," "intermediate," and "final" certificates were all in the same book, which could be slipped easily into the pocket. When the need to conserve paper first arose an unexpected and quite inexplicable mitosis occurred; the certificate book became two books, one of which contained only "first" certificates and the other both "intermediate" and "final" certificates. Since the need for economy in paper persists it can only be a matter of time before a second irrational mitosis takes place and the second book divides into two, one containing only "intermediate" and the other only "final" certificates.

We shall then be in the happy position of using three things where one would do. This is what is known as "the increasing complexity of modern civilisation."

* * *

Before I took to medicine my work gave me the chance of making friends with a lot of Eels and Butterflies. There weren't any Spivs then; they were just called Wide Boys (and that wasn't tailor talk). We still meet quite often for a quick one. So the other night, about three hours after I qualified, a rather nice Wide Eel I know rang up to congratulate me: "And now we shall have a doctor of our own," he said. "Would you like to make fifty quid? A girl I know . . ."

Letters to the Editor

SEXUAL ABNORMALITY AND THE LAW

SIR,—The recent proposals of Glover, mentioned in your annotation last week, together with other suggestions for the treatment of sexual delinquents such as those of Norwood East and Hubert, are particularly opportune in view of the forthcoming Criminal Justice Bill. However strongly one may feel that no sharp line can be drawn to divide sexual from non-sexual delinquency, the offender against sexual law is certainly singled out by existing institutions for particularly irrational treatment. Inpatient psychiatric treatment based on the type of provision which was first made in the Inebriates Act is a manifest advance in dealing with compulsive or persistent antisocial acts; but it is surely important that in defining the terms of any such reform the number and variety of offences should be reduced, and sexual practices which are not manifestly antisocial excluded.

The residue of ecclesiastical law, and the various provisions of the Vagrancy Act, act irregularly and on the whole unfairly: indecent exposure is a sexual offence, and has the benefit of the projected treatment scheme, while ink-throwing, hair-cutting, and other less obviously erotic compulsions presumably have not. In the absence of new legislation homosexuality by consent between adults and in private is punishable on very nearly the same basis as homosexual rape. In fact the consenting party becomes a principal.

It is essential to the proper working of any remedial scheme that the law should be made rational, so that the psychiatrist will be morally justified in upholding it. A solution would lie in the reduction of the number of punishable categories to three: conduct offensive to public decency, or likely to deprave or alarm others; sexual assault; and sexual assault or seduction of minors of either sex, involving an extension of the age of consent to males. Those sections of the Offences against the Person Act would be retained which relate indirectly to sexual assault, such as that prohibiting the administration of drugs with intent to ravish. There is no point of conflict between the sexual psychopath and society which could not be covered by some such scheme, without prejudice to the well-being of either. It would have the further merit of recognising the privacy of sexual conduct and terminating, so far as the threat of legal proceedings is concerned, the blackmail of respectable homosexuals. The constitutional invert who conducts himself decently is no more a suitable subject for prolonged treatment than he is for permanent segregation.

It may be argued that public opinion is unready for such a revision of the law, and that to press it now would endanger the prospect of improved psychiatric facilities. I doubt that, and I doubt whether coöperation is possible between independent psychiatry and the courts upon any other basis than a radical change in the law. While it may be possible to induce a patient to adapt himself to customs he feels unreasonable, it is rarely possible to reconcile him to acceptance of a position which is unjust.

London, S.E.23. ALEX COMFORT.

BIOLOGICAL COMPETITION

SIR,—From the facts given in your very interesting and stimulating leading article of Oct. 11 there is, I submit, a further tentative conclusion to be drawn.

It is stated that all living things appear to require certain dietary factors besides actual foods in order to live, and that there is close correspondence between the essential metabolites of bacteria and the vitamins of higher organisms. The work of Kögl[1] and others on plant growth factors (auxins) appears to indicate that plants too require substances closely corresponding to the essential metabolites of bacteria and fungi, and the vitamins of higher organisms. Kögl isolated indole-3-acetic acid (hetero-auxin) from urine, whilst other auxins have been isolated from human urine and are known to be widely distributed in animal and plant tissues.[2] Compost is prepared from animal excreta and

1. *J. physiol. Chem.* 1934, **228**, 90.
2. *Brit. med. J.* Annotation, 1943, **ii**, 176.

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plant tissues, and fungal and bacterial activity is known to be increased during its preparation.

Rowlands and Wilkinson [3] reported rat-feeding experiments with grass and clover seeds grown in soils treated by the artificial and organic manurial methods, which would appear to suggest that vitamin-B factors may well be absorbed directly or indirectly from the soil solution by plants grown under organic conditions; and in this connexion Rayner's work on the mycorrhizal association of plants should not be forgotten.[4]

It is known that natural organic manures contain vitamin-B factors, amino-acids, auxins, and intestinal bacteria capable of synthesising vitamin-B and other factors. It is believed by many that these manures produce healthier plants of greater nutritional value for animals and man. Is it not time that we of the medical profession paid a little more attention to the work of the Soil Association and to their clamouring for more research on this matter, which may well be of vital importance to the survival of our civilisation?

Hitchin. ROBERT WIGGLESWORTH.

STREPTOMYCIN IN INFLUENZAL MENINGITIS

SIR,—In your issue of Oct. 25 Dr. Gottlieb writes: "Influenzal meningitis responds to penicillin in adequate doses, as we have recently shown (*Lancet*, Aug. 2, p. 164)." The article to which he refers contains reports of 4 cases of influenzal meningitis treated with penicillin—surely an inadequate number on which to base his conclusion.

While there are a number of reports of successful treatment of this condition by varying doses of penicillin we do not seem to be justified yet in expecting success in every case, even with large doses. It may be argued that streptomycin should not be exhibited until massive penicillin therapy has failed to arrest the infection, thus freeing more streptomycin for hæmatogenous forms of tuberculosis. Even then, however, the condition of the patient might have deteriorated to such an extent that streptomycin might fail.

I therefore do not agree with Dr. Gottlieb that meningitis due to *H. influenzæ* should not for the present be treated by streptomycin. Those suffering from this disease should have the benefit of a drug which has undoubtedly proved highly successful in the United States, while at the same time the Medical Research Council can have the opportunity of comparing results in this country with those reported in America.

Stockport. C. DOVE CORMAC.

ESTIMATION OF PREGNANEDIOL IN URINE

SIR,—The methods hitherto described for the estimation of pregnanediol in human urine are, because of their lack of sensitivity or specificity, not entirely satisfactory for the determination of small amounts excreted during the menstrual cycle or the early stages of pregnancy. We have recently developed a procedure based on the methods of Astwood and Jones [5] and of Talbot, Berman, MacLachlan, and Wolfe [6]; this seems to have certain advantages over previously described methods. Using one-fifth of a 24-hour sample of urine it is possible to determine pregnanediol with fair accuracy when this is present in amounts greater than about 2 mg. per 24 hours. Four to six estimations can be completed in two 8-hour working days, and the procedure is one that can be carried out by a competent laboratory technician under supervision.

In the procedure devised by Astwood and Jones and developed by Talbot and his associates free pregnanediol is extracted by toluene from the urine after boiling with acid; and it is purified by treatment of the extract with sodium hydroxide to remove acidic substances, and by subsequent precipitation from hot ethanolic solution with four volumes of $N/10$ sodium hydroxide and/or water. This procedure has been modified by us in order to achieve the rigid standardisation of technique which is essential if small amounts of pregnanediol in the urine are to be estimated with reasonable accuracy. The most important of these modifications is concerned with cooling after the hot-precipitation purification procedure; it has been shown that rapid cooling of the precipitation mixtures results in low and irregular recoveries of pregnanediol, while slow controlled cooling regularly gives more exact quantitative recoveries. The accuracy of the method has been tested out by recovery experiments in which pure sodium pregnanediol glucuronidate [7] was added in varying amounts to 24-hour samples of human male urine. Recoveries of about 70–80% and of 90–100% were obtained when 2 mg. and more than 5 mg. of pregnanediol (as the glucuronidate) respectively were added to 24-hour samples of urine. With less than 2 mg. per 24 hours the recoveries were poor.

This method is likely to be of value in quantitative investigations of pregnanediol excretion during the menstrual cycle and in pregnancy. It may also be of some value for the diagnosis of pregnancy, and there is reason to hope that for this purpose it may be less subject to both positive and negative errors than the more rapid procedure of Guterman.[8]

Full experimental details of this work will be published elsewhere. Since, owing to present conditions, publication is likely to be greatly delayed, the authors will be pleased to supply privately full details of the procedure to any workers who may be interested. They regret, however, that they will be unable to supply samples of pregnane-3(α),20α-diol and of sodium pregnanediol glucuronidate for use as standards.

Department of Biochemistry, University of Edinburgh.

I. F. SOMERVILLE
NANCY GOUGH
G. F. MARRIAN.

3. *Biochem. J.* 1930, **24**, 199.
4. Mycorrhiza, London, 1927.
5. Astwood, E. B., Jones, G. E. S. *J. biol. Chem.* 1941, **137**, 397.
6. Talbot, N. B., Berman, R. A., MacLachlan, E. A., Wolfe, J. K. *J. clin. Endocrin.* 1941, **1**, 668.
7. Sutherland, E., Marrian, G. F. *Biochem. J.* 1947, **41**, 193.
8. Guterman, H. S. *J. clin. Endocrin.* 1944, **4**, 262; *Ibid*, 1945, **5**, 407.

A BOOK REVIEW

SIR,—With reference to the review of my *Diseases of Children's Eyes* in your issue of Sept. 27, I shall not try to deal with the matters in which that writer's opinion on clinical work differs from mine. When the reviewer states, however, that "the influence of maternal rubella in the ætiology of congenital cataract is not mentioned," he is saying what is untrue. The subject is mentioned on p. 54 of the book in question. I submit, Sir, that a reviewer's duty to his professional public should prevent him from making such a statement *unless* he has read the whole of the book which he purports to discuss. Otherwise the obvious retort must be; "What you mean is that the subject was not mentioned in those pages of the book at which you happened to glance."

London, W.1. J. H. DOGGART.

*** Mr. Doggart is right in saying that this subject is in fact mentioned on p. 54 of his book, where it receives the following sentence: "It has also been proved that infantile cataract is in many cases due to German measles affecting the mother during pregnancy." This important contemporary discovery is not, however, accorded a place in the sections on Cataract, Diseases of the Lens, or the Development of the Eye; nor do Rubella, Measles, or German Measles figure in the index. Readers turning to the book for information on the association of cataract with rubella might well share our disappointment.—ED. L.

STUDENT HEALTH

SIR,—Your readers may be aware that the British Medical Students' Association has been discussing the problem of student health for the past two years. At the last annual general meeting in London the following resolutions were made:

> "That the B.M.S.A., taking into account the hazards to which clinical students are exposed and bearing in mind the facilities which already exist in all teaching hospitals, views with concern the absence of any compulsory medical examination for clinical students on admission to hospitals. The B.M.S.A., therefore, recommends very strongly that all schools which have not already done so should with the least possible delay arrange for regular compulsory medical examinations for all their clinical students."
>
> "That the B.M.S.A. recommends that every university should appoint a full-time medical officer who, together with such assistance as may be necessary, should be responsible for the routine compulsory medical examination of all

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matriculated students with the dual object of raising the standard of student health by giving advice and of obtaining information about the student morbidity-rate and its relationship to the varying factors in university life."

Compulsion was agreed on after considerable discussion because the delegates from all over the country realised that voluntary student-health schemes, where they existed, have left a good deal to be desired. It must be further pointed out that entrance to university will in no way be influenced by medical examination as this will take place after students have already matriculated. It is hoped that the first resolution will be acceptable to many schools in the very near future. The second resolution will be sent on to the National Union of Students and the Scottish Union of Students with the hope of formulating a united student policy on this important problem.

Edinburgh. S. M. DRANCZ
President, B.M.S.A.

SOCIAL MEDICINE

SIR,—In reply to Mr. Bedwell's letter in your issue of Oct. 18, I would like to say how invaluable I have found the help of the district nurses ever since I have been in practice. But I would not dream of wasting a nurse's time on the type of case I outlined in my original letter. Such a case needs no nursing. Welfare of the simplest variety (such as that offered in many instances by the Family Welfare Association) is all that is necessary. It could be supplied by any woman with sound common sense, who has knowledge of local facilities for healthy recreation, and knowledge of how best to help the new arrival from the country to adapt him or herself to the hostel-cum-office life of our big cities.

Once more I would reiterate that I am acutely aware of the necessity of economising our use of our trained welfare and health workers. Any amount of work of the sort I have in mind could be done by voluntary workers, provided trained supervision is organised.

London, S.W.10. A. E. B. HARDING.

GRANULAR PROCTITIS

SIR,—Following Dr. Cluer's article of Aug. 2, we had a request for 3 g. suppositories of succinyl sulphathiazole for treatment of a further case of granular proctitis.

We decided to use a 120-grain pessary mould, which yields a suppository of about $1^3/_8$ in. length and $^3/_4$ in. diameter. In making the suppositories we found that the medicament had a density of about 1·2 compared with oil of theobroma. A good suppository, which set rapidly on cooling, was obtained as follows:

Succinyl sulphathiazole gr. 45.
Cocoa butter gr. 83.

We believe that this method is less laborious than that employed by Mr. Barclay for Dr. Cluer's cases.

Westminster Hospital, London, S.W.1. KENNETH MACDONALD
Deputy Chief Pharmacist.

GAUCHER'S DISEASE WITHOUT SPLENOMEGALY

SIR,—I should like to offer some criticism of Dr. Morgans's article of Oct. 18. In the summary she writes:

"A family affected by Gaucher's disease, but in whom none of those affected show splenomegaly, is described. The diagnosis was made by the detection of Gaucher cells in the bone-marrow and by the presence of typical radiological lesions in the bones. The family history suggests that in this series the disease was not only congenital and familial but also hereditary."

If we accept case 1 as a case of Gaucher's disease, diagnosed in the absence of splenomegaly on the basis of (1) a myelogram containing 0·4% of Gaucher cells, and (2) radiological translucencies in the bones, then, I suggest, the evidence submitted in regard to the other cases permits of no more than a diagnosis of "familial radiological translucencies"—to misuse the word diagnosis.

Why were not cases 2, 3, and 4, submitted to sternal punctures? We are not told that they refused. Cases 2 and 3 are included as "proved Gaucher's disease," on the basis of radiological translucencies, while case 4 is excluded on a lesser degree of translucency. Case 3 is described as a proved case of Gaucher's disease without splenomegaly, but, we are told, this case was not clinically examined.

The illusory family tree depicts 3 "proved cases"; sternal puncture was performed on only 1 of these. In the other 5 cases of "suspected Gaucher's disease" it is not known whether splenomegaly was present or absent. The diagnosis of Gaucher's disease without splenomegaly would be difficult enough to satisfy anyone with critical standards, and I would suggest that the remainder of the material submitted by Dr. Morgans, though providing her with interesting speculations, was grossly inadequate for a diagnosis of Gaucher's disease, of the disease in the absence of splenomegaly, and as being of an hereditary nature.

West Herts Hospital, Hemel Hempstead. G. A. MATTHEWS
Pathologist, E.P.S. Laboratory.

BRITAIN'S CALORIE REQUIREMENTS

SIR,—In the paper by myself and others to the Nutrition Society on Oct. 25, it was suggested that, compared with pre-war, the consumptions of sugar, meat, &c., fruit, and grain could advantageously be *decreased* by 14%, 5%, 1%, and 6% respectively—not *increased* as stated in your report last week. Only the figures for dairy products, potatoes, and vegetables represented percentage increases.

Ministry of Health, London, S.W.1. E. R. BRANSBY.

HOMOLOGOUS SERUM JAUNDICE

SIR,—In your report of the discussion on infective hepatitis at the International Conference of Physicians (Sept. 20, p. 435) you say:

"Dr. F. O. MACCALLUM proposed that the virus giving rise to epidemic hepatitis should be known as 'hepatitis virus A,' and that giving rise to homologous serum jaundice as 'hepatitis virus B.' . . . While with virus A the organism is absent from the nasopharynx and present in the fæces, urine, and serum, with virus-B infections it is present in the nasopharynx and absent from fæces and serum. . ."

Surely the whole point of homologous serum jaundice is that it can be transmitted by serum, so that the virus must be present in the serum of infected persons.

Incidentally, why cannot the illness be called just "serum jaundice"? As soon as a successful animal recipient has been found the term "homologous" will lose what little point it had. As it is, we do not say "homologous ringworm," even when we catch it from our own species.

London, W.1. RICHARD ASHER.

***We are obliged to Dr. Asher for pointing out this error. Terminology is discussed in our leader columns.—ED. L.

E.B.S. PHONE NO.

SIR,—As from Friday, Nov. 7, the telephone number of the Emergency Bed Service has been changed to MONarch 3000.

London, E.C.2. R. E. PEERS
Secretary.

DUE ACKNOWLEDGMENT

SIR,—As deputy chairman of the medical group of the Royal Photographic Society, I have been asked by the committee to point out to you that although excellent reproductions of photographs are published in your journal to illustrate articles, in many instances no recognition is given to the photographers concerned by the authors. If acknowledgments of this kind could be made regularly, my committee feel sure that it would give great encouragement to all medical photographers.

London, S.W.7. H. MANDIWALL.

REVOLT FROM THE BEDPAN

SIR,—I was most interested to read in your issue of Oct. 4 the article by Professor Bohmansson and Dr. Malmros. Messrs. Down Bros. and Mayer & Phelps Ltd., made for us a wheel-chair with w.c. seat copied from the Bohmansson chair. This has now been in use in one of the male surgical wards in the Royal Northern Infirmary, Inverness, for over three months; it is a great success and is much liked by both patients and nurses. It has all the advantages claimed for it by Professor Bohmansson. We have ordered another chair for the corresponding female ward.

Inverness. A. J. C. HAMILTON.

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PRESENT STATUS OF DISC SURGERY

SIR,—Your leading article last week would have been more valuable if it had included also "the other side of the picture." I have received from America a reprint of an article by Aitken and Bradford on End Results of Ruptured Intervertebral Discs in Industry (*Amer. J. Surg.* March, 1947).

Well written, unassuming, and I believe entirely free from bias, this article is a terrible indictment of the wholesale mutilation of spines that is proceeding at the present time under the obsession of the prolapsed disc. The flimsy evidence upon which the diagnosis is made, the high proportion (40%) of cases in which admittedly no prolapsed disc has been found at operation, the ruthless extirpation of perfectly normal discs on the wholly unwarranted assumption that they were "concealed discs" or discs which pop in and out, the extensive laminectomies and the multiple operations that have been done in some cases, and the very high proportion (67%) of unsatisfactory end-results are some of the points clearly brought out in this paper. It is noted that the cases (170) under review were dealt with by some of the most distinguished neurosurgeons and orthopædic surgeons in America. Lastly, attention is drawn to the fact that the disc is only a part of the complex articulation between two vertebræ and its destruction leads to a gross mechanical disturbance of the articulation as a whole. It is therefore becoming increasingly evident that in many cases, if not in all, spinal fusion should be a part of the operation for a prolapsed disc. Why it should be considered necessary for one surgeon to remove a disc, and for another to do a fusion, I have never been able to understand. Hitherto affections of the spinal column have always been within the province of orthopædic surgery.

No-one today doubts that the prolapsed intervertebral disc is a genuine pathological lesion. There is reason to believe that a disc normally exists under considerable positive pressure, and when it is ruptured part of it is extruded under pressure into the spinal canal. Here it forms a lump which is likely to press upon a nerve-root and cause sciatic pain. When such a lump is present, it can be found and removed by operation; when no such lump is present, the diagnosis is wrong and it is quite inexcusable to "explore" a disc by thrusting a blunt instrument into it and scooping it out.

For centuries sciatica has been known to be mainly an affection of middle-aged and elderly people, most of whom have osteo-arthritis of the lumbar spine and are liable to attacks of "lumbago." Rupture of a disc is an accident which happens in comparatively young people under stress or strain. It may cause sciatica either directly by pressing on a nerve-root or indirectly by leading to (traumatic) arthritis of the lateral joints. In ordinary peace-time conditions the prolapsed disc is probably the direct cause of sciatica in about 4–5% of cases. (This was the figure given by Grafton Love when he presented his first series of 300 cases from the Mayo Clinic.)

To say that practically every painful back is due to a prolapsed disc is fantastic. Carried to its logical conclusion it means that practically every adult human being has a prolapsed disc, for there are few of us who have not at some time or other had a pain in the back.

To say that the majority of cases respond to conservative treatment and that only a small proportion of them require operation is begging the question. Without operation there is no proof whatever that these cases have prolapsed discs.

The reduction or replacement of a prolapsed disc by manipulation is I believe pure imagination, contrary to all probability, and unproven. Like the "small bone out of place" of the bonesetter it may serve as a pretext for manipulation, and there are many painful conditions of the back which can be relieved by manipulation and physiotherapy. But no-one who has seen a disc forcibly extruded into the spinal canal is likely to believe in manipulative reduction.

Unquestionably the correct treatment for a prolapsed disc is to remove it. But it would be a thousand pities if this most valuable contribution to surgery were to become discredited by "an enthusiasm which in some instances has largely replaced common sense."

In lighter vein, but still seriously, I would protest against the suggestion of removing snails from the spine! As an example of illiterate jargon surely it would be hard to beat "excochleation of disc herniation" (*J. int. Coll. Surg.* 1946, 9, 531).

London, W.1. A. S. BLUNDELL BANKART.

Parliament

FROM THE PRESS GALLERY

Medical Practitioners and Pharmacists Bill

IN the House of Lords on Oct. 28, Lord HENDERSON introduced this Bill, whose primary purpose is to dispose finally of the various war-time problems associated with admission to the Temporary Register of doctors holding colonial or foreign qualifications. As already explained (*Lancet*, Aug. 9, p. 225; Aug. 16, p. 250) it empowers the General Medical Council to grant permanent registration (1) to doctors whose temporary registration is due to terminate at the end of this year; (2) to doctors now resident in this country who served overseas with H.M. Forces and therefore had no occasion to seek registration; and (3) to other doctors whose presence here is due to the war and who could not equitably be expected to take a British diploma. Doctors in the first two categories will have to satisfy the council that they have rendered satisfactory service in a medical capacity while temporarily registered or while serving in the Forces; and those in the third category (whose registration will be provisional for 6–18 months) must show that they are of good character and that they have been selected for medical employment in a hospital or institution approved by the Health Departments for this purpose. The Bill also seeks to regularise the position of doctors from abroad who are making temporary visits to hospitals in this country—either eminent practitioners, invited to give demonstrations, or doctors coming for postgraduate study. These will be eligible for registration while working in a hospital approved by the council.

Arrangements are proposed for registration of pharmacists holding qualifications granted outside the United Kingdom.

Local Government Bill

This Bill, presented to Parliament on Oct. 27, provides for a new system of financial assistance from the Exchequer to local authorities in England and Wales. The Ministry of Health's assumption of responsibility for hospital services, and the termination of the poor-law (see p. 692), will relieve local authorities of expenditure estimated at £63 million annually. Instead of the "block" and "supplementary" grants they now receive from the Exchequer, county and county-borough councils will get "equalisation" grants if their financial resources do not reach a certain minimum based on the average rateable value per head of weighted population. If these equalisation grants had been given in 1946–47 they would have amounted to about £33 million, which is £24 million less than the local authorities received in block and supplementary grants; but with a saving of £63 million there would be a gain of about £39 million. It is estimated that in 1946–47, 54 of the 61 administrative counties and 55 of the 83 county boroughs would have qualified for an equalisation grant.

Valuation for rates, at present a function of the local authorities, is to be undertaken by valuation officers of the Board of Inland Revenue, and a new procedure for the valuation of dwelling-houses is laid down. The first revision of current lists is to be completed by 1952 or 1953.

QUESTION TIME

Scientific and Technical Periodicals

Mr. F. J. ERROLL asked the President of the Board of Trade, in view of the urgent need to disseminate scientific and technical information in Britain, when he will increase the domestic paper ration for scientific and technical periodicals.—Mr. HAROLD WILSON replied: Steps are being taken to ensure to journals devoted primarily to original research

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their full requirements, and I hope to exempt technical periodicals from the reduction which it is necessary to make in the paper available for periodicals generally. Mr. ERROLL: Will the Minister take immediate steps with regard to the British publication *Nature*, as more copies of that publication are now available to Russian scientists than to British scientists? Mr. WILSON: I will take a look at that.—Mr. WILSON HARRIS: Could the Minister say how a technical periodical can be defined and how a non-technical periodical can make itself sufficiently technical to qualify to the increased ration?

Import of Scientific Books

Mr. N. H. LEVER asked the President of the Board of Trade if he would state the average annual expenditure in respect of the period 1940–45 upon non-fiction books imported from the U.S.A.; the amount spent in 1947 during the free period; and the estimated dollar saving expected from the recent restrictions placed upon the importation of such books.—Mr. WILSON: The value of imports in 1940–45 averaged some £170,000, and the value from Jan. 1 to Sept. 11, 1947, when the Open General Licence was revoked, was £729,000. The monthly rate of imports was increasing and it is estimated that an annual saving of nearly $5 million will result from the restrictions now imposed.

Mr. LEVER: Is the Minister satisfied that this cut will not adversely affect scientific and medical research, particularly having regard to the shortage of paper and the resulting shortage of technical books and the like in this country at present?—Mr. WILSON: We are arranging for imports of non-fiction to come in up to the rate of 100% by value of pre-war imports. I recognise that is not 100% in volume, but this new change has only recently been made. We are watching the position and if we see evidence that essential books are being kept out, we will certainly look into the matter again.

Deaf-aids

Mr. ERROLL asked the Minister of Health why, in view of the fact that 80% of deaf-aids now manufactured were one-piece aids, he had decided on a two-piece aid for free supply to the deaf under the National Health Service.—Mr. A. BEVAN replied: The decision has been taken owing to the disproportionate cost involved in using the miniature batteries required for one-piece aids.—Mr. ERROLL: In view of the fact that the Government aid is being manufactured on a mass-production basis surely it is possible to make a one-piece aid on a cheaper basis?—Mr. BEVAN: My technical advice is to the contrary. Replying to a further question Mr. Bevan said the aids would be available when the National Health Service started on July 5 next year.

Mr. ERROLL: What scale of spares and replacements had been allowed to service the aid?—Mr. BEVAN: The general basis adopted has been an annual replacement rate of 25% with a higher rate for valves owing to their shorter life.—Mr. ERROLL: Can the Minister say why a very much higher rate of replacement was decided upon in the case of this unit than is customary in normal commercial practice? Mr. BEVAN: I understood that British valves are being used in order to save dollars and we could not be sure what the experience with them will turn out to be.—Mr. ERROLL: Has not the instrument been properly tested?—Mr. BEVAN: Certainly.

Closing of Wards

Mr. C. OSBORNE asked the Minister of Health how many hospital wards had had to be closed for the lack of staff; how many hospitals were affected and what part of the country was most seriously affected; what was the cause of this situation; and how he proposed to overcome it.—Mr. BEVAN: My information is that at the end of June, there were over 50,000 beds closed for lack of staff. The hospitals were situated in most parts of England and Wales, though more in the populous counties. Causes and possible remedies have recently been examined in the report of the Working Party on the Recruitment and Training of Nurses.

Mr. ERNEST THURTLE asked the Minister if he had considered the memorandum signed by 33 medical practitioners in Shoreditch and neighbourhood regarding the threatened closing of the inpatient wards of St. Leonard's Hospital, Shoreditch, and asking that he should intervene and cause a public inquiry to take place before action to close the hospital is taken; and what action he was taking.—Mr. BEVAN replied: The London County Council have appealed to me under the Nurses Registration Act, 1919, against the decision of the General Nursing Council to withdraw recognition from this hospital as a training school for nurses. I am arranging for the appeal to be heard shortly.—Mr. THURTLE: Will the Minister bear in mind that poor people in this area to whom this hospital is a great necessity are looking for him to maintain a firm front against the General Nursing Council on this matter?—Mr. BEVAN: I will certainly take all relevant considerations into account, including the General Nursing Council.

Closure of Nurses' Training Schools

Mr. S. HASTINGS asked the Minister of Health how many of the 24 hospitals from which recognition as training schools for nurses has been withdrawn by the General Nursing Council and how many of the 37 hospitals from which this withdrawal is proposed, are municipal and how many voluntary.—Mr. BEVAN replied: Of the 24, 23 are voluntary and 1 municipal, and of the 37, 25 are voluntary and 12 municipal.

Mass-radiography Sets

Replying to a question Mr. BEVAN stated that there were 23 mass-radiography sets operating in England and Wales. Arrangements were in progress for starting 14 more, and further expansion was planned as apparatus comes forward. Up to the end of June 1,669,000 persons had been examined.

Calorific Value of Prison Diet

In answer to a question, Mr. CHUTER EDE stated that in 1938 the diet for men in prisons contained 2994–4200 calories per diem, and for women 2542–2901 calories, depending on the form of labour at which the prisoners were employed and the length of their sentence. At Borstal institutions for boys the diet contained 3775 calories per diem, and for girls 2669 calories. In 1947 the diet for male prisoners contained 2923–2955 calories per diem and for women 2541–2605. The diet for male young prisoners contained 2987–3051 calories and for female young prisoners 2521–2585 calories per diem. At Borstal institutions for boys the diet contained 3261–3389 calories per diem, and for girls 3095–3223 calories.

Anti-cholera Measures in Suez Canal Zone

Mr. HASTINGS asked the Secretary of State for War what precautions were being taken to prevent the spread of cholera to H.M. Forces stationed in Egypt.—Mr. E. SHINWELL replied: Stringent preventive measures are being taken to ensure that food and drink are free from contamination. Native villages and restaurants have been placed out of bounds, and anti-fly measures have been intensified. Attention has been drawn to the necessity for a high standard of personal hygiene. Wholesale anti-cholera inoculation has not yet been found necessary, but all men at special risk and those likely to come in contact with infected material or to pass through infected areas are inoculated. The question of inoculating all troops in Egypt is kept constantly under review and should the situation deteriorate this additional measure will be adopted at once. In the meantime inoculation is not refused to any who desire it, whether or not they are at special risk.

Calorific Value of Rationed Foods

Mr. E. P. SMITH asked the Minister of Food the calorific value of the daily food of an adult in Great Britain reckoned in terms of rationed and point foodstuffs.—Dr. E. SUMMERSKILL replied: The calorie value of the rations, including points rationed foods of the ordinary adult, is about 1530 calories per day.

Milk Ration for Babies

Mr. Q. HOGG asked the Minister of Food why he had found it necessary to cut the babies' milk ration.—Mr. J. STRACHEY replied: The milk allowance for babies up to 12 months' old has not been reduced. The reduction in the allowance to children between 1 and 5 years of age was made in preference to reducing other priority or non-priority allowances on the recommendations of our medical and nutritional advisers.

Meat for Canteens

Sir WILLIAM DARLING asked the Minister if he would reconsider the 2½*d.* per meal meat allowance to industrial canteens as compared with the civilian ration allowance of 1*s.* per week; and what action he proposed to take.—Mr. STRACHEY replied: The meat allowances to all canteens were recently cut in common with the domestic ration. I do not propose to make any alteration in the ratio between allowances to industrial canteens and those to other establishments.

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Public Health

Manchester's Water Shortage

ON Nov. 3 the Manchester waterworks committee decided that the water-supply to domestic premises in Manchester and in 25 neighbouring towns must be cut off from Nov. 11 till the service reservoirs at Longdendale are recharged. The *Manchester Guardian* of Nov. 4 points out that a reprieve is unlikely, for it could be based only on an exceptionally heavy rainfall together with a self-imposed economy of about 50%. Special arrangements have been made for hospitals and bakeries, and the needs of the sick and old people will be met by 200 water-carts; but householders will have to draw their water and carry it from the nearest stand-pipe. Some 1200 to 1500 stands will be set up and there will be a 24-hour service. The central city area is excluded because of the risk of fire, and supplies to industry will be maintained, though a 10% reduction in consumption is asked for.

Past appeals for economy have been disappointing. An appeal was made to the public on Oct. 21 for a 40% reduction, but at the end of a week the actual saving was $1^3/_4$%, and at the end of a fortnight $7^1/_2$%. The restrictions will affect some 1,200,000 people in Manchester and the surrounding towns.

Dysentery in Mental Hospital

An outbreak of Flexner dysentery which started at the Berkshire Mental Hospital, Wallingford, on Sept. 22, involved 363 cases up to Oct. 31. There have been 3 deaths, all in old people who had recovered from the acute attack; and in them the infection is thought to have been only an associated cause of death.

Between Sept. 22 and Oct. 20 there were 15 cases, but on Oct. 21 an explosive outbreak began; this continued up to Oct. 29, the daily total of new cases ranging from 20 to 72. Since then there have been only 3 or 4 cases a day. Until Oct. 17 all cases were from a single ward; on that date prophylactic sulphaguanidine treatment was instituted in this ward, from which there have been no further cases.

At first infection manifested itself by rigors, high fever, and diarrhœa with typical dysentery stools, without gross constitutional disturbance. Later, however, there was vomiting in all cases; patients were collapsed, often with extreme dehydration, but the stools were not so typically dysenteric. The attack has never lasted longer than forty-eight hours. The outbreak has proved the advantage of taking rectal swabs for bacteriological examination. Investigations are not yet complete, but the source is believed to have been a patient employed in the kitchen, who was a carrier.

Poliomyelitis and Polioencephalitis

Notifications of poliomyelitis in the week ended Oct. 25 numbered 251 and were fewer than in the previous week (276), but notifications of polioencephalitis rose from 12 to 29. The trend of polioencephalitis returns has not been very consistent, and probably there are considerable differences in the meaning attached to this term.

Provisional figures of registrations of deaths from poliomyelitis and polioencephalitis supplied by the Registrar-General are as follows: July, 74; August, 206; September, 160. It is, of course, impossible to relate these very directly to notifications, because of the varying duration of illness and possible delay in the registration of death, but the total of notifications relating to roughly the same periods suggests a fatality-rate of the order of 7%. Preliminary analysis of deaths by age suggests that the increase in the fatality of the disease in older age-groups which has been reported in other countries has also been a feature of this epidemic. It is hoped that more information on this and other matters will be derived from the survey of hospital cases now being undertaken by the Ministry of Health.

Infectious Disease in England and Wales

WEEK ENDED OCT. 25

Notifications.—Smallpox, 0; scarlet fever, 1452; whooping-cough, 1003; diphtheria, 238; paratyphoid, 3; typhoid, 4; measles (excluding rubella), 1981; pneumonia (primary or influenzal), 482; cerebrospinal fever, 34; poliomyelitis, 251; polioencephalitis, 29; encephalitis lethargica, 0; dysentery, 340; puerperal pyrexia, 125; ophthalmia neonatorum, 53. No case of cholera, plague, or typhus was notified during the week.

Of the 340 cases of dysentery, 260 were notified at Wallingford, Berks.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 1 (0) from enteric fever, 3 (1) from diphtheria, 1 (1) from whooping-cough, 69 (7) from diarrhœa and enteritis under two years, and 12 (2) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 254 (corresponding to a rate of 32 per thousand total births), including 32 in London.

Obituary

HAROLD BEN FAWCUS

K.C.B., C.M.G., D.S.O., M.B. DURH., D.C.L.

Sir Harold Fawcus's term of office as director-general of Army Medical Services covered the period 1929–34, and the reforms and adjustments of organisation made in 1926 and in 1935 were largely a reflection of his vision and influence. Indeed his retirement was postponed so that he might carry out the recommendations of the Warren-Fisher Committee, many of which he had sponsored.

He was born in 1875, the son of John Fawcus of South Charlton, Northumberland, and was educated at Durham School and University, where he graduated M.B. in 1899. During the South African war he served at first as an attached civil surgeon till he received his commission in 1900. In 1905 he took his D.P.H., and the special certificate in State medicine which he obtained at his examination for major in 1911 led to his appointment as assistant professor in hygiene at the Royal Army Medical College at Millbank. Of the informal group which grew up there, with Leishman at its head, Prof. Lyle Cummins writes:

Press Portrait Bureau

> We discussed things from the same point of view, and "discussed" the little dinners that we often had together with the same zest. Fawcus, Cumming, and I maintained a theoretical rivalry between what the old porter at the college used to call "Them 'Igenes" and the path. department as represented by Cumming and myself. Fawcus of course was quite capable of keeping his end up as the exponent of the department of hygiene.

In 1914 Fawcus was appointed an instructor at the Army School of Sanitation at Aldershot, but soon after the outbreak of war he became D.A.D.M.S., Lines of Communication. Later he served with the 3rd Army, under General Rawlinson, and as A.D.M.S., Guards Division. The war thus turned him into an administrator, but it was a principle of his that "in this war one can do anything if one only has a fortnight to pick up the details." As regards Fawcus, this was probably true. For his services he was mentioned six times in despatches, awarded the Croix de Guerre and the D.S.O., and appointed C.M.G.

After the war Fawcus became in turn assistant director-general and deputy director-general at the War Office, and in 1929 he succeeded Sir Matthew Fell as director-general of Army Medical Services, with the rank of lieut.-general. Of his work, a colleague writes: "Although Fawcus was shy, one of his outstanding characteristics was his imperturbability, and this added greatly to his strength as a good and wise administrator. His corps had a serene confidence in their director-general. He did not come to hurried conclusions, and

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where possible liked to consider all sides of a question. But when a recommendation was presented to him, which in his opinion was obviously right, he would pursue it with enthusiasm. He was invariably a long-view man, and measures for the prevention of disease met with his support as readily as the more spectacular side of his profession, for they appealed to him not only in the interests of the short-term serving soldier but also of the long-term reservist and of the general public health. Quick to realise the advantages of the use of efficient auxiliary personnel, Fawcus warmly supported the aims and object of the Army Dental Service established in 1921, holding it to be perhaps the most important step taken by the medical department in his generation."

General Fawcus left the department at his own request, a few months before his extended term of office had expired, to allow him to take up the director-generalship of the British Red Cross Society, on the death of Brig.-General Bateman-Champain. He retired from this post in 1938 and in the same year he was appointed colonel commandant of the R.A.M.C. He was also a commissioner of the Royal Hospital, Chelsea. In 1928 he was appointed C.B. and he was promoted K.C.B. in 1931. His own university conferred on him the honorary degree of D.C.L.

Sir Harold Fawcus leaves his widow, formerly Miss Mary Ross, with a son and three daughters. He died at Hillingdon, Middlesex, on Oct. 24.

JOHN WILLIAM GEARY GRANT
F.R.C.S.

Mr. J. W. Geary Grant died at the age of 81, on Oct. 23, at Weymouth, where he retired last year. He had been in active surgical practice for over 50 years and was consulting surgeon to the Royal Infirmary at Cardiff, where he lived for 34 years. The son of Admiral J. W. Grant, he qualified from St. Thomas's Hospital in 1890, and he took his F.R.C.S. in 1909. After holding house-appointments at Halifax Royal Infirmary and at the Evelina Hospital, he settled in Cardiff. For a time he was first assistant in the surgical unit of the Welsh National School of Medicine. In the 1914–18 war he was attached to the Western General Military Hospital, at Whitchurch, near Cardiff. His published work dealt mainly with abdominal surgery, and included articles on acute necrosis of the pancreas, carcinoma of the rectum, reversed rotation of the intestine, and traumatic and arteriovenous aneurysm. In 1944 in two articles in the *Medical Press* he recalled his experiences during Half a Century of Surgery.

Mr. Geary Grant is survived by his widow and by two daughters of his first marriage.

COURTENAY CHARLES WEEKS
M.R.C.S.

The Rev. Courtenay Weeks, honorary medical director and editor of the National Temperance League, died on Oct. 26 at Pershore. He was born at Portsmouth in 1872, the son of Rear-Admiral G. H. Weeks, and he took his Conjoint qualification from University College Hospital, London, in 1895. Even before he qualified he had become interested in the temperance movement, and he was president of the World Students' Federation against Alcoholism. After holding house-appointments at the Coventry and Warwickshire Hospital he practised for some years in South London before taking Holy Orders.

At the beginning of the war in 1914 he was vicar of St. Hilda, Crofton Park; but as there were no vacancies in the chaplain's department of the Services and a great need for surgeons he accepted a commission in the R.A.M.C., and he was in charge of the surgical work at the military hospital in Malta during the Gallipoli campaign. On his return to this country he served as surgeon at the Royal Herbert Hospital, Woolwich. In 1920 Dr. Weeks became a medical lecturer of the National Temperance League, and for this work both his professions provided valuable background. An effective and sincere speaker, he lectured at many public and secondary schools, and to the students of theological and training colleges as well as of the universities.

On behalf of the temperance movement Dr. Weeks presented evidence before the Royal Commission on Licensing (1929) and the Select Committee of the House of Lords on the prevention of road accidents in 1938. In 1932 he played an important part in organising the 20th International Congress on Alcoholism, and he afterwards made himself responsible for editing the report of the proceedings. In 1925 he published his monograph on *Alcohol in Medical Practice*, and in 1938 the second edition of his *Alcohol in Human Life* appeared. He was a member of the council of the Society for the Study of Inebriety, though of late the war and advancing years had made it increasingly difficult for him to attend their meetings, especially since 1940 when he became the rector of the Combertons in Worcestershire. But he continued his connexion with the National Temperance League, holding honorary office until his death.

DR. RIDDOCH

R. A. H. writes: The death of Dr. George Riddoch came as a most grievous blow to those who worked with him. To his assistants he had always been the most kindly of chiefs. He demanded a high standard of work from registrars, housemen, and clerks, and he usually obtained it, even from the most unlikely material. He took a real interest in his juniors and was always ready to help them in their later careers. His teaching was of legendary quality, and his demonstrations particularly were marked by a beautifully logical exposition of neurological problems delivered with an inimitable charm and enthusiasm. His memory for patients was extraordinary, and how they adored him. He was tired at the end, but even so he would outlast the energy of his juniors as he pursued a long ward round.

The photograph of Dr. Riddoch reproduced last week was by Richard Day.

Births, Marriages, and Deaths

BIRTHS

ALBERTS.—On Oct. 27, at Lichfield, the wife of Flight-Lieutenant Frank Alberts, R.A.F.—a daughter.
BRADY.—On Oct. 10, in London, the wife of Dr. T. J. Brady—a daughter.
CROFT.—On Oct. 28, at Kenilworth, the wife of Dr. W. H. C. Croft—a daughter.
CURL.—On Oct. 31, the wife of Dr. O. J. Curl—a son.
ESMONDE.—On Oct. 29, at Hong-Kong, the wife of Dr. P. Esmonde, M.C.—a daughter.
HUGO.—On Oct. 24, at Guildford, the wife of Mr. Richard Hugo, F.R.C.S.—a son.
RICE.—On Oct. 25, in London, the wife of Dr. David Rice—a son.
SKEMPTON.—On Oct. 31, the wife of Dr. I. P. D. W. Skempton—a son.
THORNTON.—On Oct. 29, at Edinburgh, the wife of Dr. G. H. M. Thornton—a daughter.
WYNN-WILLIAMS.—On Oct. 29, in London, the wife of Mr. George Wynn-Williams, F.R.C.S.—a son.

MARRIAGES

DENT—TEMPLETON.—On Nov. 1, at Aberdeen, Ronald V. Dent, M.R.C.P., to Mary A. Templeton, M.B.
DOWNMAN—BARAKAN.—On Oct. 24, in London, Charles B. B. Downman, M.R.C.S., to Thaïs Helène Barakan, B.SC.
MACKAY-SCOLLAY—WELLER.—On Oct. 25, at Watford, Ewart Mackay-Scollay, M.B., to Mary Weller.
RHODES—BRAMLEY.—On Oct. 25, at Ashford, Middlesex, Greville Stuart Rhodes, A.R.I.B.A., to Katerina Bramley, M.B.

DEATHS

BRAMWELL.—On Oct. 30, at Richmond, Yorks, Dan Cunningham Byrom Bramwell, M.B. Edin., aged 30.
BURGHARD.—On Oct. 31, at Cambridge, Frédéric François Burghard, C.B., M.D., M.S. Lond., F.R.C.S., colonel, R.A.M.C., aged 83.
GOBLE.—On Nov. 1, at Hayling Island, Frederick George Goble, M.R.C.S., surgeon captain, R.N. retd.
KAUNTZE.—On Nov. 4, William Henry Kauntze, C.M.G., M.D. Manc., M.B. Lond., F.R.C.P., late chief medical adviser to the Colonial Office.
LYTLE.—On Oct. 26, Robert James Lytle, M.D. Belf.
NEWTON.—On Oct. 29, at South Broomhill, Morpeth, Duncan Gray Newton, M.B. Edin., F.R.C.S.E.
PIERCE.—On Oct. 26, in London, Ward Irving Pierce, M.D. Boston, L.M.S.S.A.
SCHWIZER.—On Oct. 22, George Clemens Schwizer, M.D. Vienna, M.R.C.S.
TRUMAN.—On Oct. 26, at Nottingham, Bernard Renshaw Beckit Truman, B.A., M.B. Camb.
WEBBER.—On Oct. 26, at Sandown, I.o.W., Alexander Moxon Webber, M.S. Lond., F.R.C.S.
WEEKS.—On Oct. 26, at Pershore, Courtenay Charles Weeks, M.R.C.S., rector of the Combertons, Worcs.
WELCH.—On Oct. 26, at Haslar, Sir George Welch, K.C.M.G., C.B., M.R.C.S., surgeon rear-admiral, R.N. retd., aged 89.

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Notes and News

U.N. CHILDREN'S RELIEF FUND

LAST December the United Nations International Children's Emergency Fund was set up to aid needy children and expectant and nursing mothers in all parts of the world. An approximate survey showed that at least 60 million children in Europe and the Far East urgently required supplementary feeding and other help. The fund is still handicapped by lack of money; but aid is already being provided to between 4 and 5 million children in twelve European countries (Albania, Austria, Bulgaria, Czechoslovakia, Finland, France, Greece, Hungary, Italy, Poland, Rumania, and Yugoslavia), and in the Far East. After visiting Europe lately, Mr. Maurice Pate, executive director of the fund, expressed his conviction "that this winter will be the hardest that the people of Europe have known in eight years of war and peace."

University of Oxford

In a congregation held on Oct. 16 the following degrees were conferred:

B.M.—W. L. Gordon, G. E. Mann, N. C. Hughes Jones, O. M. Wrong, Mercy I. Heatley, *D. C. Bernstein.

* In absentia.

Royal College of Physicians of London

At a comitia of the college held on Oct. 30, with Lord Moran, the president, in the chair, Dr. F. J. Nattrass, Dr. W. Russell Brain, and Dr. R. D. Curran were elected councillors.

The following were elected to represent the college: Sir Adolphe Abrahams on the committee of management of the Conjoint Board; Dr. F. S. Langmead on the Central Midwives Board; and the President, Sir Leonard Parsons, Dr. H. E. A. Boldero, Dr. W. G. Barnard, and Sir Allen Daley on the standing joint committee of the three Royal Colleges; Dr. C. M. Hinds Howell, Dr. M. E. Shaw, Dr. J. B. Harman, and Dr. J. C. Hawksley on the Committee of Reference; Dr. Hinds Howell and Dr. J. B. Harman on the Central Medical War Committee; Sir Arthur MacNalty on the aliens committee of the C.M.W.C.

Dr. Marc Daniels was appointed Milroy lecturer for 1949, his subject being Tuberculosis in post-war Europe. The Gilbert Blane medal for 1947 was awarded to Surgeon Commander G. H. G. Southwell-Sander, R.N., and the Jenks scholarship to M. B. Watts, late of Epsom College.

The following having satisfied the censors' board were elected to the membership:

E. B. Adams, M.B. Witw'rsrand, G. F. Adams, M.D. Belf., H. St. C. C. Addis, M.B. Camb., K. D. Allanby, M.B. Lond., Harry Angelman, M.B. Lpool, R. C. Angove, M.B. Adelaide, J. W. Beattie, M.D. Belf., G. A. Bedwell, M.B. Lond., L.R.C.P., R. B. Blacket, M.B. Sydney, P. J. A. Blaney, M.B. Belf., J. J. Bourke, M.B. N.Z., W. H. Bradley, D.M. Oxfd, J. F. Buchan, M.B. Camb., G. MacG. Bull, M.D. Cape Town, W. E. Church, M.B. Camb., J. A. K. Cuningham, M.B. N.Z., G. R. Davies, M.B. Wales, E. G. Donovan, M.B. Lpool, Lennox Eales, M.B. Cape Town, Vincent Edmunds, M.B. Lond, C. H. Edwards, L.R.C.P., C. G. Fagg, M.B. Lond., L.R.C.P., Elizabeth de C. Falle, M.B. Lond., H. G. Farquhar, B.M. Oxfd, Evan Fletcher, M.D. Belf., J. O. Forfar, M.C., M.B. St. And., T. G. Fox, M.B. N.Z., Peter Frankel, M.D. Lond., E. S. Frazer, M.B. Manc., L.R.C.P., Abraham Freedman, M.B. Lond., L.R.C.P., Oliver Garrod, M.B.E., M.B. Lond., L.R.C.P., J. W. Gerrard, B.M. Oxfd, F. S. Gorrill, M.D. Lond., L.R.C.P., H. J. Hambling, M.B. Birm., H. C. Hamilton, M.B. Lond., Lt.-Col. G. F. Harrison, M.B. Lond., L.R.C.P., R.A.M.C., M. F. Hart, M.B. Lond., L.R.C.P., M. A. Hassanein, M.B. Cairo, Hung-chiu Ho, M.B. Hong Kong, Q. J. G. Hobson, B.M. Oxfd, Arthur Hollman, M.B. Lond., Stewart Hunter, O.B.E., M.B. N.Z., Joseph Jacobs, M.D. Lond., L.R.C.P., Douglas Jamieson, M.B. Glasg., J. M. Jefferson, B.M. Oxfd, P. B. Kunkler, M.B. Camb., L.R.C.P., D. N. Lawson, M.B. Camb., L.R.C.P., D. N. Leeming, L.R.C.P., John Lister, M.B. Camb., L.R.C.P., K. R. Llewellin, M.B. Lond, L.R.C.P., P. M. Luhar, M.B. Bombay, Brian McConkey, B.M. Oxfd, J. P. McGladdery, M.D. Lond., I. C. K. Mackenzie, M.B. Glasg., J. G. Millichap, M.B. Lond, L.R.C.P., G. E. Milne, B.M. Oxfd, J. N. Milnes, M.B. Camb., L.R.C.P., C. H. Naik, M.B. Bombay, Catherine A. Neill, M.B. Lond., L.R.C.P., S. G. Nelson, M.B. Sydney, M. H. Oelbaum, M.B. Manc., J. F. Pantridge, M.D. Belf., J. C. S. Paterson, M.B. St. And., Florence R. Pillman, M.B. Lond., L.R.C.P., J. B. Randell, M.B. Wales, P. C. Reynell, B.M. Oxfd, J. A. Robertson, M.B. Lond., L.R.C.P., C. A. Rumball, L.R.C.P., V. E. Sampson, M.B. Melb., C. G. R. Sell, M.B. Camb., M. L. Sharma, M.B. Punjab, J. R. Simpson, M.B. Lond., L.R.C.P., J. F. P. Skrimshire, M.B. Camb., L.R.C.P., J. S. Staffurth, M.B. Lond., L.R.C.P., S. W. Stanbury, M.B. Manc., I McD. G. Stewart, M.B. Lond., L.R.C.P., P. E. Sundt., L.R.C.P., John Sutcliffe, M.B. Camb., L.R.C.P., P. H. Sutton, M.D. Lond., L.R.C.P., R. D. Sweet, M.B. Camb., B. F. Swynnerton, B.M. Oxfd, P. E. D. S. Wilkinson, M.B. Lond., L.R.C.P., I. P. Williams, M.B. Camb., J. M. G. Wilson, M.B. Camb., L.R.C.P., R. B. Wilson, M.B. Glasg., Joan D. Wrigley, M.B. Lond., L.R.C.P., J. B. Wyon, M.B. Camb., Judith C. M. Yuill, M.B. Lond.

Licences to practise were conferred upon the following 129 candidates (99 men and 30 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the college:

K. J. Adams, B. P. Appleby, D. E. Argent, E. M. P. Ball, T. W. Barnes, A. F. Barnett, D. W. G. Bartlett, R. W. A. C. Barton, Barbara Baxter, Kathleen M. Beech, Alfred Beck, Audrey Beder, Evelyn M. P. Bedwell, Joseph Bendas, Nancy L. C. Berry, J. B. Binks, T. D. Brentnall, D. J. Brewer, Margaret L. M. Bridges, G. B. Brown, G. B. Burchell, Evangeline Burgess, A. R. P. Calder, Emily M. Collingridge, Stanley Compton, E. P. Cooke, M. H. D. Cooper, D. J. Cowan, I. W. Crown, D. M. Curtis, Phyllis Dagnall, E. T. Dakin, D. W. Davies, A. M. Dickinson, A. E. Dossetor, Evelyn S. Elliott, James Elstub, H. R. Erskine, E. J. Fairlie, G. E. Faulkner, R. A. W. Feakes, Rosalind Fellowes, Margaret M. F. Fitzpatrick, Mary E. Forrester, Roy French, P. S. Gardner, F. P. A. Garton, Joseph Gay, Mohamed Ghousuddin, N. M. Gibbs, Elizabeth M. Gorst, D. B. Goss, George Hacking, Jean Hansell, J. L. Hardman, M. A. Heasman, A. G. Henderson, Mary M. Herley, Miriam Hirtzel, Eleanor M. Hoole, J. B. Howard, Jean A. Infield, L. J. Ison, W. B. James, A. L. Jeanes, J. G. Jeffs, M. S. Johnson, Cliffard Jones-Morgan, Ruth V. Kemp, D. W. Kennard, J. V. Kilby, Alwin C. B. Latham, W. C. Lathbury, R. H. N. Long, Derrick Lonsdale, Mary A. J. Lourie, K. N. H. Low, W. E. MacBean, D. Y. Mackenzie, D. L. M. McNeill, R. I. Maitland, D. N. Mitchell, D. C. Morley, Sybil M. Murray, Hannah Mushin, Srigakula Narayana Setty, J. E. Noble, H. R. Odlum, E. G. Old, Barbara Oldham, J. H. H. Oliver, R. L. Osmont, R. D. Pearce, Eileen M. Pearson, Laurence Phillips, B. G. Pickles, Allen Pilling, J. S. Porterfield Fikret Rassim, W. H. Rees, M. C. T. Reilly, Doreen M. Reside, P. W. H. Robinson, D. J. H. Rogers, J. R. Scholey, B. K. Scott, Margot Shiner, Elisabeth Shoenberg, Ronald Sloman, R. I. L. Smallwood, C. W. Smith, P. H. A. Sneath, D. J. R. Snow, Walter Spector, H. B. Stafford-Kemp, D. P. P. Thomas, Bernard Towers, E. J. Trimmer, D. J. Tucker, Betty M. L. Underhill, J. H. B. Urmston, C. W. J. Ussher, J. K. Walker, A. L. Warlow, B. M. Watney, F. E. Weale, J. S. Weiner, A. W. Weller, H. D. Yauner.

The following diplomas were conferred jointly with the Royal College of Surgeons:

D.C.H.—Isabella M. Almond, Lionel Apter, M. W. Arthurton, N. C. Begg, Marjorie Bell, P. C. Bhattacharjee, Evelyn L. Billings, Ruth Blackwood, M. P. Bourke, Phyllis E. M. Bowen, Rosemary R. M. Bradmore, Lilian M. Burbidge, Angela E. D. Burns, Mary W. Coxon, D. G. Crawshaw, Agnes A. Crone, D. E. Cullington, Enid Curran, J. E. A. David, Gwendoline E. Davison, G. K. Dhariwal, E. M. Dimock, Douglas Eglin, H. H. A. Elder, Nora C. Elphinstone, Benjamin Epstein, H. C. Falcke, O. D. Fisher, Shanti Ghosh, Mary E. Goodson, R. R. Gordon, Muriel D. Graham, John Griffith, Don Hilson, Helen C. Humphreys, Stewart Hunter, A. F. Huston, Margaret Ingham, Harry Isenberg, I. P. Jaffe, R. T. Jenkins, S. T. H. Jenkins, G. G. Jones, Megan P. Jones, R. S. Jones, Amy K. Jungalwalla, S. E. Keidan, J. J. Kempton, Israel Kessel, Beryl E. Lewis, Joyce R. Lewis, I. M. Librach, Duncan Macaulay, Grace E. McClafferty, W. E. MacLean, R. F. Maggs, Margaret D. C. Martin, J. D. H. Matthews, W. R. May, Kate Menashe, J. A. W. Miller, W. J. Moffett, N. G. Mojumdar, Isiaha Morris, Stella M. Murray, T. N. Nauth-Misir, Sheila M. M. Niall, Leslie Pannall, Diana G. Paradise, C. V. Patel, I. E. Phelps, Rosa M. Piggot, J. N. A. Pritchard, H. S. Provis, Margaret Readman, P. A. H. Rivett, Cecilia M. Robinson, Sheenah J. McK. Russell, Elias Sanders, M. J. A. Sandrasagra, S. S. Schmulian, Elizabeth M. Sefton, Joseph Shein, S. C. Sheth, Rosemary J. S. Sichel, J. C. Simson, Margaret Slater, Evelyn A. Souter, Maurice Stein, J. MacF. Stuart, J. H Tan, Sheila R Tangye, W. F. J. M. Thom, P. A. Thorn, R. B. Tulk-Hart, G. S. Udall, Elizabeth G. Vaughan, C. K. J. Vautier, Glenys J. Wade, B. D. R. Wilson, Lydia A. Wilson, E. R. Winton, Basil Wolman, L. G. Woods, Marjorie Wright, Trevor Wright.

D.O.M.S.—Solomon Adler, L. P. Agarwal, R. M. Archer, N. K. Barber, Januariusz Bienkowski, M. W. Bird, W. G. Bridges, K. B. Brown, R. A. Burn, Helena B. A. Casey, David Christison, C. A. G. Cook, E. H. L. Cook, B. C. Curwood, L. W. Davies, E. A. Donegan, G. F. Ensor, K. B. Forsyth, D. P. Greaves, T. S. S. Gregory, F. B. Halliday, H. J. Hamelberg, Edward Heffernan, J. M. Heller, C. R. S. Jackson, N. S. Jain, Sarah J. Jenkins, T. S.-B. Kelly, P. J. M. Kent, D. A. Langley, Marion McArthur, John McClemont, P. H. N. Matthews, W. S. Milne, D. G. Mody, E. S. Perkins, J. S. Philipotts, F. C. Rodger, Maeve Rusk, M. H. M. Ryan, Q. R. Schindler, D. T. Shortridge, F. N. Shuttleworth, D. G. Simpson, C. S. Smalley, J. L. S. Smith, C. H. H. B. Sparrow, Geoffrey Sutherland, W. M. Walker, Nina S. S. S. Warwick, S. E White, Eunice M. Wilson.

D.T.M. & H.—G. M. Abraham, G. T. Allen, J. F. Britto, J. H. Cater, K. H. Cheung, S. Childs, J. H. C. Clarke, Lesley M. B. Copland, M. A. C. Dowling, A. J. F. Eberle, E. N. Emmerson, Zarina A. Fazelbhoy, S. K. Ganguli, V. T. H. Gunaratne, M. T. Gyi, Vera W. D. Hall, K. P. Hare, W. D. Hughes, J. P. F. Hummel, M. P. Hutchinson, Frances C. Kerr, S. N. Kothare, Phaik-Lin Lim, N. W. Low, P. C. Mahanty, B. K. Naik, A. A. Odier, A.-H. A.-R. Omar, C. P. Patel, D. N. Patel, A. J. Patterson, R. A. O'G. Pearson, H. J. A. Richards, J. G. Salter, R. S. Saxton, J. C. Shee, R. P. Shields, W. P. Stamm, K. G. B. Stork, Robert Symons, W. F. J. M. Thom, Emanuel Tuckman, H. W. Wheate, Hanna H. Wozniak, G. B. Wright.

D.M.R.-D.—Ifan Ap Thomas, Eric Batley, J. L. Boldero, J. S. Campbell, P. S. G. Campbell, A. F. Crick, C. G. Edwards, J. B. Fawcitt, David Hector-Jones, A. K. Lamballe, M. W. H. Mackay, Elsie L. Mettam, W. R. Parker, J. N. Pattinson, E. N. Pearlman, S. P. Rawson, David Sutton, B. W. Thomas, J. M. W. Wells, C. G. Whiteside.

D.M.R.—K. W. Beetham, D. G. Bratherton, E. C. Easson, J. M. W. Gibson, Herbert Holden, K. S. Khambata, N. S. Lockyer, J. L. E. Millen, T. K. Morgan, B. A. Stoll.

D.P.H.—Alexander MacFarlane.

D.L.O.—Ben Cohen.

D.Phys.Med.—A. C. Boyle, M. C. Woodhouse, Andrew Zinovieff.

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University of Glasgow

The following degrees were conferred on Nov. 1:

M.D.—Patrick Macarthur (with commendation); F. J. Hebbert, J. E. Tillotson.

Royal College of Surgeons of Edinburgh

At a meeting held on Oct. 29 the following office-bearers were elected for the ensuing year: president, Mr. Frank Jardine; vice-president, Mr. James Graham; secretary and treasurer, Mr. K. Paterson Brown; members of the president's council, Sir John Fraser, Dr. G. Ewart Martin, Mr. W. Quarry Wood, Mr. Walter Mercer, Prof. J. R. Learmonth, and Dr. W. F. Theodore Haultain; representative on the General Medical Council, Sir Henry Wade; conservator of museum, Mr. J. N. J. Hartley; convener of museum committee, Mr. Quarry Wood; librarian, Dr. Douglas Guthrie.

The following were admitted to the fellowship:

John Aitken, M.B. Glasg., H. M. Bennett, M.B. Belf., S. M. Boctor, M.B. Cairo., Y. G. Bodhe, M.B. Bombay, E. S. Brawn, M.R.C.S., J. E. S. Carmichael, M.B. Edin., Florence Cavanagh, M.B. Melb., D. H. Clark, M.B. Glasg., J. C. Comline, M.B. Edin., W. T. Cumming, M.B. Edin., J. B. Cuthbert, M.B. Lond., N. M. B. Dean, M.B. Edin., Derrick Dencer, M.R.C.S., M. D. Desai, M.B. Madras, G. de L. Fenwick, M.B. N.Z., W. J. Fraser, M.B. Edin., Debabrata Ghose, M.B. Calcutta, I. L. Gregory, M.B. Manc., A. P. Guttman, M.D. Manitoba, J. A. V. Hamilton, M.B. Glasg., H. El S. Higazi, M.B. Cairo, R. M. Hugo, B.M. Oxfd, John Huston, M.B. Belf., G. C. W. James, M.R.C.S., J. M. Jones, M.B. Lond., V. A. F. Martin, M.B. Belf., Esmond Millington, M.R.C.S., J. C. G. Moore, M.B. Dubl., George Murdoch, M.B. St. And., A. M. Murray, M.B. Glasg., M. P. McCormack, M.B. Edin., C. G. G. Mackay, M.B. Edin., F. D. Mackenzie, M.D. McGill, D. L. Poddar, M.B. Calcutta, E. W. Price, M.B. Camb., Agnes R. Russell, M.B. Glasg., W. H. Scrase, M.B. Birm., Emanuel Seidenman, L.R.C.P.E., N. C. Sen, M.B. Calcutta, N. C. Shah, M.B. Bombay, H. V. Shaibany, M.B. Lond., K. J. Sheth, M.B. Bombay, D. W. Short, M.B. Glasg., F. MacN. Smith, M.D. Alberta, C. E. E. Stevens, M.B. Belf., F. V. Stonham, M.B. Melb., J. W. M. Sutherland, M.B. Aberd., A. F. Torrie, M.B. Edin., S. L. Townsend, M.B. Melb., H. M. Urquhart, M.B. Edin., C. H. Vipond, M.D. Queen's Univ., Ontario. R. G. Maclagan Wedderburn, M.B. Edin., V. H. Wheble, B.M. Oxfd, J. S. Young, M.D. Queen's Univ., Ontario.

Franco-Anglo-American Medical Society

At a meeting of this society at 11, Chandos Street, London, W.1, at 2.30 P.M., on Tuesday, Nov. 11, with Lord Horder in the chair, the subject of discussion will be a joint research programme with the French in evolution of the society's international climatic health service, preparatory to reopening in 1951. All interested, lay or professional, are invited to take part in the deliberations. The acting hon. secretary of the British section is Dr. F. Aylmer Hort.

Contributions for Europe

In connexion with its appeal for the relief of distress on the Continent this winter, the Save Europe Now organisation (15, James Street, W.C.2) announces that during the week Nov. 30 to Dec. 7 temporary depots will be set up all over London for receiving gifts of rationed food, second-hand clothing and shoes, second-hand linen, and books. The organisers will be grateful for offers to provide such depots anywhere in the London area.

National Insurance Advisory Committee

The Minister of National Insurance has appointed a committee to assist and advise him in the operation of the National Insurance Act, 1946. The committee will shortly begin to consider the draft regulations for the Act which the Minister is required to submit to them, and all persons affected will have an opportunity of putting before them any objections to the regulations. Sir Will Spens has accepted the chairmanship of the committee and the eight members include Dr. John Ritchie, formerly M.O.H. for Dumfriesshire.

Conference on Mental Health

The National Association for Mental Health is to hold a conference at Seymour Hall, London, W.1, on Jan. 15 and 16. Subjects and speakers include: re-adaptation to life and work of persons who have suffered from nervous or mental disorder (Dr. G. R. Hargreaves, Dr. Donald Stewart); the handling of difficult children (Mr. E. M. Bartlett, PH.D., Miss Clare Britton); the responsibilities of local authorities in relation to mental health (Dr. Kenneth Soddy, Dr. Doris Odlum); and education for mental health as a national and international responsibility (Brigadier A. Torrie, M.B., Dr. J. R. Rees). Inquiries should be addressed to the conference secretary at 39, Queen Anne Street, London, W.1.

Pharmacy Working Party

A working party has been appointed by the Minister of Health and the Secretary of State for Scotland to investigate the differences between the work of pharmacists in England and Wales and in Scotland in dispensing and supplying medicines and appliances, with particular reference to the position likely to arise under the National Health Service.

Middlesex County Council is to make representations to the Minister of Health with a view to obtaining an increased allocation of meat, bacon, and fats for patients undergoing institutional treatment for tuberculosis.

Appointments

Middlesex Hospital, London:

LAWRIE, R. S., M.D. Lond., M.R.C.P., F.R.C.S.: first assistant, professorial surgical unit.
LE QUESNE, L. P., M.A., B.M. Oxfd, F.R.C.S.: second assistant, professorial surgical unit.
PAULLEY, J. W., M.D. Lond., M.R.C.P.: first assistant, professorial medical unit.
PILE, G. C. L., M.A., M.S. Camb., F.R.C.S.: senior assistant, department of thoracic surgery.
SEMPLE, ROBERT, M.B. Aberd., M.R.C.P.: second assistant, professorial medical unit.

Diary of the Week

NOV. 9 TO 15

Monday, 10th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
6.15 P.M. Mr. E. D. D. Davis: Malignant Disease of the Pharynx.
SOCIETY OF APOTHECARIES OF LONDON, Black Friars Lane, E.C.4
5 P.M. Prof. S. J. Cowell: Recent Trends in Diet Therapy.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Dr. William Evans: Cardiac Pain.

Tuesday, 11th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Mr. Harold Nicolson: Health of Authors. (Lloyd-Roberts lecture.)
ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. John McGibbon: Otitis Media in Childhood.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Psychiatry.* Dr. Fraser Steele: Assessment of Prognosis in Psychiatry.
INSTITUTE OF DERMATOLOGY, 15, Lisle Street, W.C.2
5 P.M. Dr. I. Muende: Pathological demonstration.
EDINBURGH POST-GRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Prof. W. S. Tindal: Modern Approach to Miracles.

Wednesday, 12th

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine.* Dr. W. Russell Brain and Mr. D. W. C. Northfield: Brachial Neuralgia.
5 P.M. *Proctology.* Mr. A. Dickson Wright: Total Colectomy. (Presidential address.)
SOCIETY OF APOTHECARIES
5 P.M. Dr. Frank Howitt: Rehabilitation.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Prof. W. C. W. Nixon: Diet in Pregnancy.

Thursday, 13th

ROYAL COLLEGE OF SURGEONS
5 P.M. Sir Cecil Wakeley: Vogue and Fashion in Abdominal Surgery. (Bradshaw lecture.)
ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
5 P.M. Mr. D. J. MacRae: Heart Disease in Pregnancy. (Blair-Bell lecture.)
ROYAL SOCIETY OF MEDICINE
5 P.M. *Ophthalmology.* Mr. D. D. Stenhouse-Stewart and Dr. A. A. Newth: Policy in Dealing with Partially Sighted and Blind Persons.
SOCIETY OF APOTHECARIES
5 P.M. Sir Howard Florey, F.R.S.: Recent Advances in the Laboratory Investigation of Penicillin.
INSTITUTE OF DERMATOLOGY
5 P.M. Dr. J. L. Franklin: Cutaneous Neoplasms.
HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Dr. E. A. Carmichael: Dynamics of the Cerebrospinal Fluid.

Friday 14th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. W. A. Mill: Neurological Disorders of the Pharynx and Larynx.
TUBERCULOSIS ASSOCIATION
3 P.M. (Royal Empire Society, Craven Street, W.C.2.) Dr. F. R. G. Heaf: Accommodation for the Tuberculous. (Presidential address.) Mr. Hamilton Bailey and Dr. Suzette Gauvain: Tuberculous Glands of the Neck.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. J. R. B. Hern: Dyspnœa.
ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh
8 P.M. Mr. George Perkins: Broken Ankle.

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THE HEALTH OF AUTHORS*

The Hon. HAROLD NICOLSON
C.M.G., F.R.S.L.

I AM fully conscious that this evening I am addressing an audience composed to no small extent of very formidable experts. However enthralling may appear to me my views, either about health in general, or about my own health, or about the health of others, I am aware that my interest in these subjects will be shared by few. My sense of audience, my sense of occasion, would thus in any case deter me from advancing any medical, or even psychological, theories. I shall not do that. Indeed I possess two qualifications only for the task before me. I have devoted much of my life to the study of the literary temperament: and I have had the good fortune to know, and sometimes to know intimately, many of the leading writers of my own country and of other countries. All I can hope to do is to lay before you, as simply as I can, the results of this experience.

So much for the problem of audience. What about the problem of subject? The title of this lecture contains, as you will have observed, two operative words—namely, "health" and "authors." I shall not trouble you much with the physical health of famous writers, except in so far as I shall seek to disprove the popular fallacy that all mighty poets must be of an ailing constitution and doomed to an untimely death. I shall be concerned rather with the mental health of authors and more specifically with that form of nervous activity, or sensibility, which enables its possessor to receive—if I may beg the question for a moment—"intimation" and "inspiration." In other words I shall seek to examine how the mind of the creative writer works.

In what sense again, to complete these introductory definitions, shall I be using the word "author"? We all tend, when viewing from outside the members of any calling or profession, to regard them as constituting a uniform category or type. I am aware, for instance, that I myself am inclined to regard lawyers as a type, or soldiers as a type, or sailors as a type. They also, I am quite sure, regard all writers, whether they be creative writers or hack writers, as more or less uniform, as the almost indistinguishable components of a small eccentric clan. Yet although the prolonged pursuit of any calling is undoubtedly apt to impose a certain uniformity of mode, manner, speech, and even countenance, the members of such a calling—however strong may be their herd instinct—do not regard each other as uniform; but as multiform. The *outsider* observes the superficial similarities; the *insider* notices only the individual dissimilarities. In using the word "authors" as if it designated a category or class I am thus aware that I am using a term which has but little meaning. To include within that term all those who earn their living by the pen would be to extend the area of my inquiry to a quite unmanageable circumference. I shall therefore restrict myself to those writers who can justly be called "creative," in the sense that by the force of their imagination, or the delicacy of their perception, they have discovered new combinations of experience. And since of all writers poets are, within this meaning of the term, the most "creative," I shall in general concentrate my observations upon the behaviour and temperament of poets. Within these restricted limits I shall have certain information to give and certain very tentative suggestions to advance.

THEIR BODILY HEALTH

I referred just now to the popular fallacy that all creative writers, and especially all poets, are of weak bodily constitution and as such liable to premature death. This fallacy has arisen, not so much because a large proportion of poets have suffered untimely death, but because almost all poets have imagined, and have loudly proclaimed, that they were destined to die young. I should hesitate to deny—although I shall carefully refrain from examining—the oft-repeated theory that there exists some affinity between the literary and the consumptive disposition. There is little doubt that, in the 19th century at least, a high proportion of creative geniuses (and the names of Keats and the Brontës occur to one immediately) succumbed to tuberculosis. Yet if one examines objectively the mortality statistics of eminent writers one does not find that their bodily, as distinct from their mental, health (and I am aware that this is a dangerous distinction)—one does not find, I say, that their bodily health was any worse than that of their illiterate contemporaries. If, for instance, one takes a list of the thirty-two most famous British poets who flourished between the middle of the 14th century and the end of the 19th, one is struck by the fact that, given the contemporary expectation of life, they were remarkable for their longevity. Of these thirty-two famous poets as many as ten lived beyond the age of 70, nine died between the ages of 60 and 70, seven between the ages of 50 and 60, two between the ages of 40 and 50, and only four under the age of 40. Nor should we forget that many of these mighty poets did not, during their lifetime, take that care of their health which their medical advisers would have recommended. Ben Jonson and Michael Drayton, as we know, were of a convivial disposition, and in fact some authorities have attributed Shakespeare's final illness to the effects of their uproarious visit to Stratford a few weeks before his death. Yet Ben Jonson lived to the then ripe age of 65 and Michael Drayton to the age of 68. Herrick and Marvell were not particularly austere, yet each of them lived to over 70. Swift and Dr. Johnson during their lifetime were tortured with the dread of premature decay, yet Swift retained his bodily health at least until the age of 77, and Johnson was 75 at the time of his death. Tennyson again, who during his middle life was a confirmed hypochondriac, lived to the venerable age of 83; and Swinburne, whose early manhood was not distinguished by any pronounced asceticism, lingered on at Putney until his 74th year. I doubt whether if one examined the lives of thirty-two famous clergymen, lawyers, or merchants between the 13th and the 19th centuries one would find that they could show an equally high average of survival.

And what of the four mighty poets who did in fact suffer an untimely death? Keats, it is true, died of consumption in Rome at the age of 26; but the deaths of Marlowe and Shelley were due, not to health, but to accident. Marlowe was killed at the age of 29 in a tavern brawl at Deptford; and Shelley at the age of 30 was drowned in a squall off Viareggio.

There are those who contend that the fourth of these premature deaths, the death of Byron at the age of 36, was also due to an accident. Such people aver that, but for the incompetence of the local doctors at Missolonghi, Byron would have survived to a reputable and perhaps repentant old age. This assertion is to my mind an unfair reflection upon the professional skill of Doctors Bruno and Van Millingen. As I have devoted much study to the last illness of Byron, and as it still constitutes one of the unsolved medical mysteries of literary history, you will perhaps allow me, in fairness to his much abused doctors, to digress outrageously for a moment and to examine the facts of the Byron case.

According to the accepted story, Byron died of a rheumatic fever at Missolonghi, induced by rowing in an open boat across the lagoon after being heated by riding and drenched by a thunderstorm. His doctors are accused of having failed to

* The Lloyd Roberts lecture for 1947, delivered before the Royal College of Physicians on Nov. 11.

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diagnose his illness and of having bled him to death. The facts do not confirm this theory. People forget to mention that on Feb. 15, 1824, two months before his death, Byron was struck down by a convulsive fit, which he himself, perhaps incorrectly, assumed to be epileptic. On the advice of Major Parry, he treated himself for this affliction by drinking enormous quantities of cider laced with strong insertions of brandy: I cannot believe that in the paludal climate of Missolonghi that was a wise thing to do. It is quite true that in April he was drenched in a thunderstorm and that two days later he went out riding on a saddle which was still wet. Yet if his ten days' illness, which lasted from April 9 to April 19, was in fact rheumatic fever it is strange that he did not suffer the intense pain associated with that illness and even more strange that he was able on April 14 to walk unassisted from one room to the other. Nor is there any mention in the many accounts of his illness either of the heavy perspiration or of the swelling joints which rheumatic fever, as I understand, invariably produces. I am advised indeed by those experts whom I have consulted, that Byron's final illness must have been either typhoid or pernicious malaria.

And what about the famous accusation that Drs. Bruno and Van Millingen bled their patient to death? They may have wished to bleed him copiously, but they did not succeed. Obstinately he refused to be bled until almost the last moment, remarking, perhaps not inappropriately, to Dr. Bruno that "the lancet, as he well knew, had killed more people than the lance." It was only on April 16, three days before his death, that he at last consented to be bled. According to Dr. Van Millingen's account he stretched out his arm with the angry words "Come; you are, I see, a damned set of butchers; take away as much blood as you will; but have done with it." This is confirmed exactly in Dr. Bruno's account, who records him as "prestando il braccio in una maniera disgustosa." They then drew a full pound of blood but the fever did not, to their surprise, subside for long. It may well be that, in his then condition, a pound of blood was an excessive quantity to have drawn; but I am assured that in so doing Byron's doctors were in no way violating the conventions of their age. And I doubt whether, even if, as was hoped at one time, an English doctor could have reached him from the garrison at Zante or Corfu, this consultant would have made any very different diagnosis or have prescribed any very different treatment.

The death of Byron was undoubtedly a misfortune, but we should be unfair to Drs. Bruno and Van Millingen were we to perpetuate the legend that it was also an accident.

In any case I have, I suggest, said enough to indicate that the bodily health of authors, if I may venture such an expression, is as sound as that of the members of any other calling. I must now pass to the more interesting consideration of their mental health, or, as I should prefer to phrase it in less controversial terms, to a consideration of the literary temperament.

THEIR MENTAL HEALTH

The theory that there exists some special connexion between literary genius and mental derangement is one which, to my mind, has been seriously exaggerated. It is true that a few creative writers have in their later years become demonstrably insane; it is also true that almost all creative writers have at some moments of their lives been panic-striken by the conviction that their imagination was getting the better of their reason; but it is not in the least true that *all* creative writers have been mad *all* the time.

I must admit that the authorities for this distressing theory are both honourable and ancient. Plato contended that there were two forms of what he called delirium—namely, insanity and inspiration. "I have observed this about poets," he writes in the Apology. "It is not by taking thought that they create what they create; it is owing to a natural disposition and when ecstatically possessed." Burton, in *The Anatomy of Melancholy*, gives us the short sharp phrase "All poets are mad." Shakespeare assures us that—

> "The lunatic, the lover and the poet
> Are of imagination all compact,"

he speaks of "the poet's eye in a fine frenzy roving"; and in the less familiar conclusion to this famous passage he gives us the following suggestive lines:

> "Such tricks hath strong imagination,
> That, if it would but apprehend some joy,
> It comprehends some bringer of that joy;
> Or in the night, imagining some fear,
> How easy is a bush supposed a bear!"

Dryden in *Absalom and Achitophel* gave popular currency to this idea in his perhaps too well-known couplet:

> "Great wits are sure to madness near allied;
> And thin partitions do their bounds divide."

Macaulay goes so far as to say "perhaps no person can be a poet, or can even enjoy poetry, without a certain unsoundness of mind." And Lamartine speaks of "that mental malady which men call genius."

I could, if I so desired, extend by any number of quotations the comments which writers have passed upon their own mental derangement. I have quoted enough however to establish the point that writers are themselves largely to blame if the general public regard them as unbalanced. In their lack of reticence, in their self-conscious habit of examining their nerves in public, it is they, rather than the outsiders, who have created the legend of their instability.

Yet the legend persists. As an example of the lengths to which it can be pushed I should refer to Mr. J. F. Nisbet's well-known book entitled *The Insanity of Genius*, which was published in 1891, and which every year since then has caused a great amount of pain to a large number of people. "Genius and insanity," writes Mr. Nisbet, "are in reality different phases of morbid susceptibility of, or want of balance in, the cerebro-spinal system." In the strictly medical sense this may, for all I know, be true; but it is distressing for a creative writer, and disturbing for his family and descendants, to be told that what he and they believed to be a glorious boon from Apollo is in fact no more than a diseased condition of what I understand is called the *medulla oblongata*. Mr. Nisbet, moreover, although from time to time he will let fall a word or two of comfort, examined the case-histories and the family histories of distinguished writers with sadistic glee. If the grandfather or grandmother of an author can be shown to have possessed a weak chest or a tendency to rheumatism, their unhappy grandchild is accused by Mr. Nisbet of being congenitally neurotic. I am not exaggerating. Let me quote the relevant passage from Mr. Nisbet's cruel work. "Genius," he writes, "insanity, idiocy, scrofula, rickets, gout, consumption and other members of the neuropathetic family of disorders, are so many different expressions of a common evil—an instability, or want of equilibrium, in the nervous system." I am not saying that, in a technical sense, this may not all be true; but surely if one applied similar all-embracing tests to the case-histories and the family histories of civil servants, bankers, postmen, and even aviators, one would arrive at a closely similar result. To contend that a man is liable to mental derangement merely because his uncle suffered from gout is to advance a contention which, you will agree, is palpably absurd. Of course all creative writers are nervous; even Horace, that complacent hedonist, referred to them as the *genus irritabile vatum*—"that tetchy breed of bards"; but to be nervous, even to be extremely nervous, does not necessarily imply that one is suffering from a nervous disease.

It is for these reasons that I reject the extreme imputation which is suggested by Dryden's couplet and which has been expanded in Mr. Nisbet's long, and I must admit extremely interesting, book. But it is not enough merely to reject the imputation. I must examine the evidence and make at least some suggestions as to how,

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even in the minds of creative writers themselves, the legend has arisen.

THEIR LATER YEARS

A few eminent writers have, it must be admitted, relapsed in their later years into a state of idiocy. Others must honestly be described as "borderline cases." And almost all creative writers have been convinced at one time or another that they were about to lose the control of their own brain.

Yet of the thirty-two famous British poets whose longevity I commended at the outset of this lecture, only two became demonstrably insane. Swift throughout his life was haunted by the spectre of insanity. "I shall be like that tree," he once said to a friend, indicating a decaying elm, "I shall die from the top." Yet Swift in fact lived to the age of 77 and it was only in the last three years of his life that his intellect became clouded. William Cowper, the "stricken deer" of Lord David Cecil's beautiful biography, was subjected from his 21st year to recurrent fits of melancholia and suicidal mania. Twice in his life he almost succeeded n hanging himself and was only saved by chance. Yet although Cowper had twice to be placed in confinement, or at least under supervision, he enjoyed long interludes of perfect sanity, during which he composed much excellent poetry and was happy in a quiet tea-party sort of way. It cannot be said that Cowper was ever a demented maniac; the worst that could be said of him was that he was sometimes sadly confused in the head.

Dr. Johnson might, I suppose, be regarded (and would certainly be so regarded by Mr. Nisbet) as a borderline case. He suffered at times from auditory hallucinations and he cherished many strange delusions, such as his belief that he would get drunk if he ate an apple. He was, poor man, obsessed by the dread of losing his wits. "Insanity," records Boswell, "was the object of his most dismal apprehension, and he fancied himself seized by it, or approaching to it, at the very time when he was giving proofs of more than ordinary soundness and vigour of judgement." There is no evidence that this dread was anything more than one of Dr. Johnson's many harmless delusions. But he certainly pushed it far. He entrusted his secret to Mrs. Thrale, and whenever he felt that madness was approaching, he would persuade her to lock him in his room and it seems to place gyves upon his legs, and even to whip him with a rod. Certain obscure references in Mrs. Thrale's journal and letters, and in the Doctor's own diary, can only be interpreted in this sense. But although Johnson was unhappily convinced of his own impending mental collapse, he in fact retained his sanity to the very end. He died of asthma and dropsy at the age of 75.

To these borderline cases Mr. Nisbet would I suppose add that of Southey. It is true that in his 70th year Southey's mind became clouded twelve months before his death. It is true also that Carlyle, after a visit from Southey, exclaimed "how has this man contrived, with such a nervous system, to keep alive for near 60 years?" But there is no real evidence to suggest that Southey, except during the last twelve months, was anything but certifiably sane.

ECCENTRICITY: THE CASE OF SHELLEY

If therefore, out of my thirty-two famous British poets, only two can be described as definitely mad, and only one can with justice be classified as a borderline case, how comes it that the legend of mental illness among creative writers has been so persistent? That, I repeat, is to a very large extent the fault of the writers themselves. All writers, and especially all poets, feel it dull to be thought completely normal. They thus divulge and even display their eccentricities. Nor should I deny that these eccentricities exist. Let me give you the example of Shelley.

I should describe Shelley as on the whole a sane and normal person. One has only to read his *Defence of Poetry*, or his *Julian and Maddalo*, to realise how stable, except in moments of excitement, was the poise of his mind. Yet from his childhood Shelley had possessed what his mother would have described as "a highly strung nature," and the passionate rages into which he was thrown by being bullied at Eton caused him to be known by his school-fellows as "mad Shelley." The facility with which English schoolboys attribute insanity to anyone who is not perfectly attuned to their own herd behaviour has always struck me as curious and distressing. Shelley was certainly not mad; but he was eccentric, and his eccentricity took two particular forms.

In the first place he was a hypochondriac. All creative writers are hypochondriacs, since those of them who do not worry about the state of their bodies are certain to worry about the state of their minds. Shelley, having little gift of self-criticism, seldom regarded himself as mentally afflicted, but he persistently regarded himself as very very ill. Hogg speaks of his "unfounded frights and dislikes, his vain apprehensions and terrors." It was no comfort to him that his doctors, and even his moneylenders, insisted that his was a thoroughly good life in the insurance sense of that term. He was convinced that he was consumptive and entering upon a decline. Even when consumption ceased to obsess him he would invent fresh diseases with which to lacerate his anxieties.

On one occasion he found himself in a crowded stage-coach opposite a lady whose legs were unusually distended. He had recently been reading a book of travels in which there was a description of the disease known as elephantiasis or Barbados leg. He jumped to the conclusion that this disease must be contagious and that he had caught it from the lady with thick legs in the coach. Within a few hours he observed upon his hands the symptoms of cracked and roughened skin which, as he had read, were the presages of this dire disease. Two days later, while sitting in an armchair talking to Mr. and Mrs. Newton, he fell writhing upon the carpet. His hostess, in pardonable anxiety, asked him what was wrong. He informed her, still writhing, that he had been assailed with a sudden and acute attack of elephantiasis. And, according to the testimony of both Hogg and Peacock, he persisted in this unhappy delusion for several weeks.

The second form assumed by Shelley's eccentricity was that of spectral and auditory hallucinations. It is customary for very gifted writers to see spectres and to hear voices calling. After all, even Goethe (who assuredly was a man of the most Olympian calm and sanity) once met himself riding along a road on horseback. Shelley's hallucinations were vivid and detailed. On one occasion, while walking near Pisa, he saw a man coming slowly towards him dressed in a long cloak and with a hood or cowl hiding his face. When the man was only a few yards distant he raised his hood, and Shelley was much startled to see that the man was in fact himself. The spectre then addressed a question to him in the Italian language. "*Siete sodisfatto?*" it asked him, "Are you satisfied?" At which the spectre vanished or passed on. On another occasion, at Lerici, Shelley saw a baby rise from the sea and clap its hands at him. These are, in so far as I know, the only two recorded instances of Shelley's hallucinations; but it is evident from the writings of his friends that these sounds and visions were of not infrequent occurrence. And yet Shelley, I repeat, was certainly not mad.

If one is to account for these departures from reality, one can only do so by considering in what manner creative writers, and especially poets, are inspired. Inspiration is a sudden flash or fusion between sense and fantasy, between reason and imagination. It is generally both a confusing and an exhausting episode, and one which often leaves behind it a bruise in the mind. "Such tricks," wrote the greatest of all poets in the passages I quoted earlier—"Such tricks hath strong imagination."

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I now propose, in my concluding sections, to make some reflections upon the nature of inspiration such as will, I trust, convince you that the illusions—or if you like, the hallucinations—of creative writers are not grave symptoms of mental alienation but merely the tricks which a strong imagination is all too apt to play.

DIVERSITY OF TEMPERAMENT

I stated at the outset of this lecture that it would be an error to regard all authors, or even all creative writers, as constituting a uniform category or type. They are in fact multiform. Even in their methods, their hours, and their habits of work they display an astonishing diversity.

There are those, for instance, who possess the intense powers of concentration so startlingly manifested by Archimedes and who would agree with Newton, and also with Thomas Edison, that all creative thought is due to "patient attention." Such writers, and Wordsworth was one of them, can only bring their work to completion by agonised plodding along a single road. Others prefer a constant variation of theme. Thus Jane Austen kept *Sense and Sensibility*, *Pride and Prejudice*, and *Mansfield Park* upon her desk in various stages of completion, and would flit from one to the other. Burns and Beethoven were often engaged upon two or three themes at the same moment. And de Musset expressed the view that it was good for the mind to have a "twofold exercise."

Some geniuses can only begin to write in the silent privacy of their own studies, and to them even a blackbird calling becomes a person from Porlock. Others are actually stimulated by interruptions. Thackeray found that his ideas flowed more freely in the congested, if somnolent, atmosphere of the Athenæum Club. Mozart actually preferred when composing to be surrounded by the hum of general conversation, in which, incredible as it may seem, he would often participate. A similar talent, so I am told, was possessed by Sidney Keyes, that gifted poet who was killed in Tunisia at the age of 21. Keyes, it seems, was able to write poetry when surrounded by his undergraduate friends, and he would alternate his attention between composition of a poem and awareness of the conversation which was proceeding around him. And Schubert wrote one of his loveliest songs on the back of the bill-of-fare while sitting listening to the band in a public beer-garden.

Some authors find it more stimulating to commune with their muse in the early morning; others—such as Balzac, Byron, Dostoievsky, and Conrad—could only work well at night. Some people—and I am told that Miss Edith Sitwell is one of them—write best in a recumbent position; Voltaire at Ferney did most of his dictating from his bed. For others, movement is necessary. Many writers—and Dr. Johnson among them—have recorded that their ideas flowed more freely to the movement of a carriage or a train; Victor Hugo composed some of his loveliest lyrics when sitting on the top of an omnibus between Passy and the Bourse. Helmoltz has recorded that his mind never worked so rapidly as "during the slow ascent of wooded hills on a sunny day." Milton asserted that he could only write really well between October and March; other writers, including Tennyson, are more often inspired during the spring and summer. Even the technical tricks and habits of authors vary enormously. Schiller found it necessary to stimulate his unconscious by keeping rotten apples in the drawer of his writing-table. Thackeray, Mme. de Stael, and Southey found that their brains would only begin to ferment if they held an actual quill or pen in their hands; and many authors of my acquaintance have confessed to me that their ideas only begin to flow easily if the objects on their writing-table are arranged in a certain pattern. There are moreover few writers who would not agree that when stuck in a passage they find it necessary to leave their table and pace rapidly around the room.

I have quoted these divergencies of method and habit in order to indicate that if there in fact exists such a thing as the literary temperament then assuredly it assumes the most diverse forms. These differences between authors in the actual practice of writing bring into sharp relief their general agreement in regard to the principle of writing—namely, the nature of inspiration. Almost all writers who have ventured to express views upon this intricate matter are agreed that inspiration is an event which has no apparent connexion with conscious thought. They are all agreed that it is something spontaneous, sudden, and transitory; they are all agreed that it is something phenomenal and extraneous to the personality which receives it; and that it brings with it a sense of inevitability, naturalness, and conviction. Allow me to examine these assertions in greater detail.

THE NATURE OF INSPIRATION

All creative writers are agreed that inspiration—or if you prefer the word, "intimation"—is independent of the conscious mind. "Poetry," writes Shelley, "is not like reasoning—a power to be exerted according to the determination of the will." "It won't come," says Byron more simply, "when called." For Byron in fact inspiration was invariably a verbal impulse; he was incapable of that plodding assiduity which Wordsworth and A. E. Housman displayed. "I can never recast anything," he wrote to Thomas More, "I am like a tiger; if I miss the first spring, I go back grumbling to my jungle again." All poets, and I regard them as the true exhibits of the creative writer, are thus agreed that inspiration can by no means be commanded. "It comes," said Thomas Gray, "as the maggot bites."

Inspiration, moreover, is not only extraneous to the person experiencing it, but it is also irresistible; the victim feels himself to be possessed. "It seems," wrote Thackeray, "as if some occult power were moving my pen." This feeling—which is common to all writers and not confined only to poets—accounts doubtless for the personification of the nine muses and for the frequent references which we find in the confessions of authors to their ministering spirit or "daimon." It is a further proof of its assumed extraneous quality.

Poets and writers also refer to the "inevitability" of inspiration and to its utter naturalness. "If poetry," wrote Keats, "come not as naturally as the leaves to the tree, it had better not come at all." There is a story of Blake, when shown by Constable a drawing of fir trees, exclaiming "But this is not drawing: this is inspiration." "I never knew that before," answered Constable, "I meant it for drawing."

Even more interesting is the almost universal insistence among poets and creative writers upon the transitory nature of all these sudden intimations and inspirations. "The mind in creation" wrote Shelley—and the idea has seldom been better expressed—"The mind in creation is as a fading coal, which some invisible influence, like an inconstant wind, awakens to transitory brightness. Could this influence be durable in its original purity and force it is impossible to predict the greatness of the results; but when composition begins, inspiration is already on the decline." The same idea echoes in the tragic stanza in which Carducci concluded his *Canto dell 'Amore*: "Alas! I had heard one note of the eternal poem. And what is this? Just a tiny little verse" (*e picciol verso or è*). All writers are conscious of the transitory nature of these sudden intimations; some of them take precautions to capture the butterfly before it flits away. Rossetti and Tennyson always carried notebooks in their pockets; Thomas Hardy would scribble phrases or ideas that came to him suddenly upon the bark of a tree when walking; and Thomas

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Hobbes used to keep writing materials attached to his walking-stick in order to take notes "immediately a thought darted."

Almost universal also is the sense of loneliness, abandonment, failure, and pathetic incompetence which assails creative writers when the fleeting intimation has passed by. Some of them complain bitterly that their muse has left them for ever and that they will never be able to write again. Some of them resort to stimulants, opiates, or narcotics. Others do not believe in waiting patiently for the mood to recur but assert that the only method of recapturing inspiration is to go on slogging methodically and hard. "Work patiently every day," wrote Flaubert, "and an equal number of hours." The same dogged method was applied by Balzac, Trollope, and to a certain extent Wordsworth also. Others seek to revive their flagging imagination by listening to music or by reading the works of others. Milton, for instance, when inspiration flagged used to spend his evenings reading his favourite poets in order, as he expressed it, "to store his fancy against the morning."

Others again, and they are the fortunate ones, rely almost entirely upon what Mr. Graham Wallas has called "unconscious cerebration." There can be little doubt that this unconscious cerebration often works. It is said, for instance, that Swinburne suddenly thought of the line "Only the song of a secret bird" and sat up late that night trying to hammer out a poem around it. It failed to come. When he woke up next morning he wrote the whole poem out at a single sitting. The *Ballad of Dreamland* which resulted is not, I admit, a very good advertisement for the process of unconscious cerebration. Let me remind you of the opening lines:

> "I hid my heart in a nest of roses,
> Out of the sun's way, hidden apart;
> In a softer bed than the soft white snow's is,
> Under the roses I hid my heart . . ."

and so on. You will agree that unconscious cerebration might have done better. It is curious moreover that although poets have often woken up believing that they have during their dreams composed a masterpiece, the verses thus suggested prove, if written down, to be complete nonsense. Cerebration therefore ought not to be quite so unconscious as all that. Mrs. Gaskell in her admirable biography tells us that Charlotte Brontë would often moon about for weeks and even months without being able to put pen to paper. And then suddenly one morning "the progress of her tale lay clear and bright before her." Perhaps the most deliberate and cheerful practitioner of the method of unconscious cerebration was Sir Walter Scott. He always claimed that the half-hour between waking and rising was for him the most propitious moment for composition. "This is so much the case," he wrote, "that I am in the habit of relying upon it, and saying to myself when at a loss, 'Never mind! We shall have it at seven o'clock tomorrow morning.'" Mr. Graham Wallas agrees with Sir Walter Scott in advocating unconscious cerebration as a deliberate method of, or device for, literary composition. "In the case," he writes, "of the more difficult forms of creative thought . . . it is desirable, not only that there should be an interval free from conscious thought on the particular problem, but also that the interval be so spent that nothing should interfere with the free working of the unconscious, or partially conscious, processes of the mind." It was with this idea, doubtless, that the late Lord Balfour used to recommend to those of his staff who were suffering from overwork a three days' course consisting of detective novels and champagne. He would contend that by this method the blood was drawn away from the congested centres of the brain. And having on one occasion in my life been obliged to submit to, or to enjoy, this system, I am prepared to believe that both Mr. Graham Wallas and Lord Balfour were correct. Nor would any regular writer or thinker deny for a moment that the effects of subconscious cerebration are frequent, beneficial, and mysterious.

THEIR RELATIONS WITH REALITY

I must now come to some conclusion. I have suggested that, in so far as concerns what as a layman I may perhaps be allowed to call "bodily health," the author is neither more, nor less, healthy than any other sedentary individual. The creative writer, the poet, and the artist do however possess a certain special nervous sensibility, which manifests itself not merely in their receptivity to inspiration but also in certain, apparently morbid, eccentricities. When poets and writers contend, as they so invariably do contend, that "inspiration" reaches them from outside they are describing an experience which is in no way abnormal but perfectly natural. It is true that these sudden and transitory intimations reach them from outside the area of their consciousness; they reach them from their subconscious; there is no need at all to drag in the supernatural phenomena of muses and daimons. Genius, in spite of Buffon and Carlyle, is not either a "great aptitude for patience" or "a transcendent capacity for taking trouble." It is a *spontaneous* activity of the cells and fibres of the brain whereby new combinations of impressions are constantly being formed. In insanity, as Mr. Nisbet has remarked, the nerve-connexions which should enable an individual to remain in touch with his surroundings are weakened or destroyed; in genius these connexions remain intact. Yet there does often occur, in moments of inspiration or intense creative activity, some flooding of the conscious by the subconscious, and therefore some dissociation from reality. This mingling or flooding may in some cases produce extreme absence of mind and even hallucinations. More usually it creates that "trance-like state" to which W. B. Yeats referred. And almost always it produces some confusion between the imagined and the real, between the earthly life of the individual and the ideal world which he has peopled and conceived. "Now let us talk of realities," said Balzac to Jules Sandeau, "let us talk about Eugenie Grandet." It was this that Dickens meant when he said to Forster, "I don't invent it: I see it and write it down" or when he assured Lewes that he actually heard every word that his characters addressed to him. It was in this sense also that Flaubert, having described the suicide of Madame Bovary, felt a strong taste of arsenic in his mouth and was physically sick. No writer has ever composed or imagined anything of value without passing through these strange processes of identification. Yet such manifestations, I repeat, are not necessarily symptoms of morbidity; in almost every case they are as natural to an author as are the leaves to the tree.

Be sure of one thing always. All authors are not of the same value or endowed either with comparable talents or with an identic temperament. At the bottom of the scale you have those men and women who, being gifted with a certain capacity for observation and narration, can both notice and annotate the world which swims around them. Such writers are as happy and unperturbed as water-beetles jerking with long prehensile legs along the surface of the village pond. In a higher scale come the novelists who from their memories and associations construct an imaginary world of their own which to them becomes one-half, and perhaps more than one-half, of reality. For them imagination is a diffused and comparatively constant frame of mind, and when inspiration comes to them, it comes, not as some intense and terrible visitation, but as a sudden and most welcome dissolution of an accumulated perplexity.

Raised above all others, living in a rarefied ether of their own, confused by the eternal dissonance between the ideal and the real, the mighty poets are a race apart.

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For them imagination is no happy mood but a superb and agonised bewilderment. Not for them are the tiny pleasures, the small disappointments, the trivial success and failure, of the lesser breeds. The God visits them, not amicably, but in a flash of flame and fire; and in the after vacancy they know that they have caught but a momentary glimpse of intimation: their triumph is clouded by the knowledge that their illumination has been so narrow and so short.

Yet remember this also. No writer, however feeble he may be, can be of any value unless he possesses a powerful imagination; and powerful imaginations, as Shakespeare assures us—and he ought to know—are apt to play one tricks. Be kind, therefore, I beg you, to all authors, and above all to poets. Do not snub them when they assure you that they have caught elephantiasis from a lady in a bus; do not assume too solemn an expression when they confide to you that in Jermyn Street yesterday afternoon they met a gentleman in a tussore suit who, upon inspection, proved to be themselves; be gentle with them when they complain, as all authors have at every stage of their careers complained, that their mind and memory have crumbled and that the Muse will never visit them again. And never urge them in any circumstances to take a rest; no creative writer ever *can* take a rest; urge them only to embark upon some different sort of work, even if it be only detective novels and champagne. And remember always, I beg you, that they are seldom quite so mad as they believe; or as they seem.

PREFRONTAL LEUCOTOMY AND THE DEPERSONALISATION SYNDROME

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THE distressing symptom of unreality both in self (depersonalisation) and surroundings (derealisation) can arise in the early stages of all neuroses and psychoses and in some organic conditions.

This paper is concerned with patients in whom depersonalisation is fundamental, the predominant and presenting symptom, existing almost alone as a clinical entity. Such cases of "primary" depersonalisation, or the "depersonalisation syndrome" (Shorvon et al. 1946) as it is often termed, tend to be of long duration and unvarying symptoms, and they are notoriously difficult to treat successfully. Psycho-analysis, convulsive and insulin shock therapy, abreaction techniques, and cerebral stimulants so far can claim few successes. Since these patients have insight into their condition they are often greatly distressed and may become seriously depressed or suicidal. They are intensely preoccupied with self, and there is a heightened self-awareness.

It is well known that a frequent after-result of leucotomy is a diminution in preoccupation with self and in self-awareness. Hence there are some a-priori grounds for using this operation in intractable cases of the depersonalisation syndrome where other methods of treatment have failed. In the Board of Control (1947) report on prefrontal leucotomy performed in 1000 cases there is only one mention of depersonalisation. The statement that "depersonalisation persists but less vivid" is included in a random group of follow-up returns, and there is no specific reference to the depersonalisation syndrome although it is frequently met with clinically. Freeman and Watts (1942) tabulate fifty symptoms showing various degrees of relief after leucotomy, and one of the listed symptoms is depersonalisation. Of 22 cases in which this symptom occurred, 19 showed a persistent relief of depersonalisation, 2 temporary relief, and 1 was unchanged. Their results are concerned with depersonalisation as a secondary symptom, and Reitman (1946) found similar results where the symptom occurred among other symptoms in schizophrenics who responded well to orbital leucotomy.

Since practically nothing else has been said about depersonalisation in the extensive literature on leucotomy, experience of the operation in cases of severe and intractable primary depersonalisation is worthy of record. The first 5 cases of depersonalisation syndrome in a series at the Sutton Emergency Hospital for which prefrontal leucotomy was performed are described here. The later cases appear to be showing similar results.

FIVE CASE-RECORDS

Case 1.—A woman, aged 38, when first admitted to Sutton Emergency Hospital in November, 1944, under the care of Dr. Dalton Sands, complained of a sudden onset of unreality three weeks after the birth of her third child in May, 1938.

Her father is morose, has bouts of silence, and often punished her; her mother is highly strung, jealous, superstitious, and modest to the point of stupidity.

Patient was brought up very strictly, did well at school, and worked as a nursemaid and domestic until her marriage in 1932. She had a child by a soldier before marriage, but her husband was aware of this and did not consider it a problem.

Her personality before the illness was described as precise, happy, energetic, and meticulous, with obsessional ruminations, phobias, and unshakable ideas.

She felt ill and weak after the onset of unreality, had recurrent attacks of panic, became depressed and suicidal at times, lost interest in her baby, and could not do the housework.

There was little change in four years; so she entered a mental hospital as a voluntary patient in 1942 and remained eighteen months. Five 'Cardiazol' shock treatments produced no change. After five weeks at home she was readmitted and received ten electric convulsion shocks and a course of continuous narcosis without benefit.

Early in 1944 she entered another mental hospital, where she was treated with thyroid without response, and she then attended for another six months a voluntary hospital outpatient department, again without improvement.

On admission she said the illness began suddenly, when everything seemed to change and she felt a different person: "The outside world had gone wrong; the noise of the twigs of the trees scraping the windows upset me; it was unreal." She blamed the anæsthetic used at the confinement and said: "I feel all the time I am talking about someone else, not myself; it seems as if all I do or say does not come from the mind at all; all my thoughts appear to be functioning outside the room I am in; my head feels as if something is missing in it; I act the part and work quite automatically; I feel like a machine; it seems to be me; my head feels dead; all my feelings have gone for my husband and children; time means nothing; the sun does not look bright, and nothing gives me pleasure; I don't enjoy food and can go on eating but never feel satisfied; my stomach feels empty like a shell."

She was dull and depressed and spoke in a monotonous tone but had insight into the abnormality of her thoughts, and this disturbed her emotionally. She had lost all sexual desire for six years, and was 3 st. underweight. Depersonalisation syndrome in an obsessional personality was diagnosed.

Her husband considered that her condition was hopeless since all treatments had failed, and readily agreed to an operation, adding: "You might as well otherwise put a shilling in the gas-meter."

Psychotherapy and a course of deep insulin had little effect, and she showed recurrent episodes of tension, when she became tearful and emotional and slept badly.

Mr. Wylie McKissock performed a prefrontal leucotomy in March, 1945, and there was considerable hæmorrhage, since she was restless and excited. In the evening she was restless, noisy, and mildly aggressive, and vomited fairly persistently for some days. She was placid and generally

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apathetic a week after the operation and the feelings of unreality were still present.

Some weeks later she showed a complete absence of tension, appeared flat and disinterested, and expressed little or no emotion. Her condition then became fluid, and at times she felt her old self and ceased to complain of depersonalisation symptoms.

Two months after leaving hospital she felt "pretty fit" and ran her home but complained of little feeling towards her husband and family and tended to be sarcastic and short-tempered.

Three months later she described herself as much better but not quite right, since she was depressed at times, felt indifferent, lacked affection, and did not derive the pleasure from things that she would have got years ago.

A year after the operation she had no unreality feelings, which she said gradually disappeared after the operation, and she was definitely better except for some off days. Her affections had improved, but she claimed to be more short-tempered and irritable than before the illness: "I should say 80% cure; nothing worries me; I am interested in everything and active."

Now, 2½ years after the operation, she is cheerful, somewhat disinterested, "lives for the day," and complains about "being on the level" all the time. . . . "I don't go up or down." She carries on normally at home, is even-tempered, and gets on well with her husband and children, but has little libido. There is some lack of affect, and she makes no plans for the future. When asked if her husband thought the operation worth while she answers, "Oh, yes, definitely." The same question put to her brought the reply, "Of course! I would rather live as I am now than then. It was terrible." She claims the operation has taken away all her dreadful fears and she has no symptoms of depersonalisation.

Her husband reports: "She is now (Aug. 8, 1947) able to cope with her normal duties, shopping, housework, &c., and in addition has taken on part-time work as a ward orderly at a hospital. Her pace is much slower, but this may be due to her having put on more weight. When it gets round to 10 P.M. she has had enough and is ready for bed, and should she have to stay up much after that she gets irritable. She has no interest whatever in the sexual act. Past events in her life are hazy, and during conversation, whereas she would normally think twice before giving an answer, she now says what comes into her head, whether it offends or pleases. Although she does get occasional spells of depression she is able to cope with them, and our life together is as happy as present conditions will allow. The operation was far more successful than I ever expected it would be."

This case demonstrates the gradual recovery after leucotomy of a patient suffering from the depersonalisation syndrome for six years. The usual methods of treatment had failed. The operation was performed 2½ years ago, and she is comparatively well, carrying on a fairly normal existence without any signs of a relapse.

Case 2.—A woman, aged 42, was readmitted to Sutton in March, 1946, complaining of persistent unreality and inability to visualise for two years. This was her sixth and most severe attack.

She had had a hard and difficult childhood owing to the early death of her father, and had been brought up by anybody who would look after her. The situation had improved when her mother remarried, but her stepfather was harsh.

At the age of 2 years she lost an eye in an accident, and the glass eye induced a feeling of inferiority; but she did very well at school, though unable to take up a scholarship for financial reasons.

She married at 19; her husband is quick-tempered, and they often quarrelled. There were seven pregnancies, and she was ill with anxiety and vomiting in each. Her previous personality was described as anxious and obsessional, yet lively, energetic, and a good mixer.

The first attack of depersonalisation occurred at the age of 16, after an upset, when her fiancé joined the Army and left her. She was distressed, and suddenly "everything went strange, unreal, and I was a different person." She became very frightened and had fears of insanity but made a spontaneous recovery in a few weeks.

The second attack, at the age of 20, began three weeks after a severe first confinement and lasted three months.

A third attack ensued fourteen months later, three weeks after her second confinement, and lasted longer. It gradually passed off after a course of psychotherapy.

She was well after a third pregnancy two years later, but another spell of depersonalisation came on six weeks before the fourth confinement, and persisted well into the puerperium. During this pregnancy there was a good deal of domestic trouble, and her mother's death left her without help.

The next confinement two years later was uneventful, but a fifth attack of depersonalisation followed three weeks after the sixth confinement. She thought then she would never recover and would be better dead, but the symptom cleared after six months. She was free from symptoms at her final pregnancy and remained well for eleven years.

The present illness began in April, 1944, a month after an operation for hernia (apart from the anæsthetic with this operation, she had one during her first confinement). She described the onset and symptoms as follows: "I just sink into a kind of unconsciousness; I am just conscious enough to know that things are going on round me, but nothing seems to register; it is too far away to keep these things in my mind; I carry on automatically but I can't think; my body tries to work for the part of my brain that does not; I concentrate and get things a little back, but the strain is too strong, and as soon as I relax everything has gone again; my head is dead, and the part that makes life real has gone completely; I see things with my eyes but not with my mind; time is gone, is a blank; it is as if time has not been; every day goes into emptiness, it disappears, and I am not aware of its going; there is a gap between myself and realisation; everything is in a daze, far away."

This condition persisted with little variation in intensity. She was severely depressed and tearful and slept badly, and a course of ten electric convulsion shocks in outpatients produced no benefit. She was admitted to Sutton in April, 1945, when a further four electric convulsion shocks, psychotherapy, and insulin therapy were given without effect.

On readmission in 1946 she had lost 2 st. in weight and her condition was unchanged. Though she regained the weight-loss with the help of modified insulin, numerous therapies such as 'Benzedrine,' 'Epanutin,' cardiazol shocks, abreaction techniques, vasodilators, gland extracts, and psychotherapy were tried and proved futile. She remained a picture of hopelessness and despair.

Mr. McKissock carried out a prefrontal leucotomy in July, 1946. There were some mild behaviour disorders for a time after the operation, and for several days the patient answered only in a whisper, repeating that she was bodily tired and could not worry. Later she showed a curious mixture of apathy and mild elation, but a fortnight after the operation she said that she was quite well and had lost her feelings of unreality.

A week later she was euphoric, could visualise, had lost her disturbances in time, and was rather overactive and intolerant. She returned home cheerful and free from her symptoms of depersonalisation, though mildly euphoric and argumentative, and carried out very successfully her numerous and onerous domestic duties.

At a later interview she said: "I keep wondering how it is that I got well so suddenly; I can concentrate and visualise; I don't worry about tomorrow; I go to pictures and enjoy walks; I lose my temper a little and must argue, but I have to answer if I am right; I am not dead any more; sexual feelings normal." She has for some time now been doing her housekeeping, cooking for her husband and seven children, and managing a part-time job to supplement the family income.

Her husband reports (Aug. 10, 1947): "I think she is completely cured, because she does not worry any more and she does all the work in the house and goes for all the things that have to be got for a large family like ours."

In contrast to case 1, this patient made a dramatic recovery from her extremely severe depersonalisation symptoms very soon after leucotomy. She is now, a year after the operation, leading an active and useful life.

Case 3.—A man, aged 30, was first seen as an outpatient in May, 1942, when he said he had been invalided out of the

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Army with an anxiety state and he wished to see a psychiatrist. He described the sudden onset of symptoms of unreality one morning in October, 1934.

Patient lived with his parents and two sisters. He was, and still is, frightened of his father, who is unsympathetic and bears him animosity. His mother, who often had to hide him from his father, is a nervous ailing woman of poor intelligence, and he is fond of her. A maternal grandfather suffered from epilepsy, and a maternal uncle died in a mental hospital.

He was a frightened timid child, pampered by his mother, and afraid of getting hurt. His school record was reasonably good, and he worked for a time as messenger and clerk. He is said to have had a happy disposition and a sense of humour before the illness, was a keen reader and fond of company, but indulged in obsessional ruminations and compulsions. From his early years he had almost weekly severe headaches. He had been engaged for several years, but much to his fiancée's exasperation they drifted along—he considered his symptoms a handicap to marriage.

The illness began in 1934 when working on a landing at his place of work. "The whole world seemed to change and people crossing the landing from one room to another seemed to do so with amazing rapidity. No sooner had they come out of one door than they were at the other. Also it seemed to me that the atmosphere had gone dull and darker." This was followed by giddiness, pains in the eyes with spots "floating" in front of them, and coldness of limbs. He complained of a far-away vague and dazed feeling and became preoccupied with "time."

For some years before the onset he had become increasingly tired and overworked in a new job driving a lorry and trailer for long hours, but he had changed to light work and was much more relaxed when the symptoms began. He carried on despite his symptoms but was puzzled, bewildered, and mildly depressed. The pain in his eyes increased in severity, and he developed bouts of giddiness in which he seemed to move round but did not fall or lose consciousness. His headaches became more severe, and he had attacks of trembling, shivering, and coldness. He was also constantly looking at the clock, since he was unable to account for the passage of time.

This condition continued more or less unchanged, but he was not severely depressed till 1937, when the symptoms became more intense. He was then having to take frequent periods of sick leave, and from 1937 to 1940, when he was conscripted into the Army, he had spells of unemployment or casual work, no job lasting longer than three months.

During the excitement of the first year in the Army he felt comparatively well and gained promotion, but with exacerbation of his symptoms he was soon reduced to the ranks and discharged. After a succession of jobs he was admitted to Sutton in April, 1944, in an anxious depressed state. He regarded himself as a failure, and was self-concerned, morbidly introverted, and obsessional.

There was little change after a course of psychotherapy, and on discharge from hospital he attempted numerous jobs in the country, since he was afraid of staying in London because of the flying-bombs. His obsessional thoughts became very insistent, with particular reference to the "passage of time," and he lost weight and remained depressed and drawn.

The feelings of unreality never disappeared entirely since their onset in 1934, though they were slight and did not trouble him at times; but on readmission to hospital in 1946 he had an acute feeling of unreality, a dazed feeling, and a feeling of vagueness which he found very difficult to describe.

Ether abreaction and benzedrine were unsuccessful, and there was no change in his mental state, though he put on weight with insulin. He was then treated with electric convulsion therapy, but after the third treatment he became severely confused and muddled, with an increase of his symptoms of depersonalisation. "Everything seems to have changed. The world is changed and unreal, and I am far away and outside everything. The time seems all wrong, and I can't grasp anything." He bitterly blamed the therapy for the deterioration in his condition.

Again numerous treatments, such as excitatory abreaction under cardiazol and 'Pentothal,' continuous narcosis, and vasodilators, produced little or no change, and he continued to feel dazed and in a fog. Finally he attempted suicide.

Mr. McKissock carried out a prefrontal leucotomy in June, 1946. Patient refused food for several days after the operation and was noisy at times. A fortnight later he would smile benignly and say that his preoperative symptoms were worse, though he was obviously improved and not preoccupied with his previous complaints.

The following week he said he was no longer thinking about the passage of time. "I don't know what made me harp on that at all." Nevertheless, though he was unable to worry any longer, had lost his headaches, stopped writing miserable letters, and was active and cheerful, he said he was no better.

A well-marked change occurred when he left hospital. He lost his unreality feelings, obtained a better job than any he had previously held, and married.

Interviewed a year after the operation his wife said he was happy, interested, and better than when she first knew him, since he was "not half so shy." Patient said he was glad the operation was done, and everything seemed fine, though his eyes felt slightly heavy and he had an occasional slight headache. The physical change was striking, since his face had smoothed out and he looked fatter and healthier. He is doing well in the same job.

This is a case of a chronically obsessional individual with twelve years' history of depersonalisation who lost his symptoms two months after leucotomy. His personality appears to have improved as a result of the operation.

Case 4.—A woman, aged 26, readmitted to hospital in September, 1946, complained that for three years she had suffered persistently from a "blindness of the mind" and an "inability to visualise."

Her mother is of an anxious disposition and had a nervous breakdown at the age of 28, probably depressive, and her father died a few weeks ago. Patient is one of triplets; the two triplet brothers are well. An elder brother has postencephalitic personality changes.

She had a happy childhood until the age of 8, when her brother developed encephalitis. He became troublesome and spiteful to her, though she was very attached to him. Her school record was good despite frequent attacks of "twitching of the limbs," and she also had a good record at skilled occupations, such as printing and electrical engineering. She had been unofficially engaged to a soldier for several years but did not marry, since she considered it her duty to look after her brother.

Her previous personality is described as that of an energetic worrying over-conscientious obsessional type with a tendency to depression and hypochondriasis, but she had many friends and hobbies. She has a rheumatic valvular affection, some hypertension, and a benign fullness of the thyroid.

Early in the war 1939-45 her invalid brother was the only sibling to remain at home. She was very active, working many hours a day, but devoted all her spare time to her brother and could not dismiss him from her mind; yet he made her life "a living hell with his unsocial nasty tricks and sneers." She developed a sinking feeling in the stomach, a fear of tuberculosis after a friend in her factory had contracted it, and had recurrent attacks of sweating and trembling.

In September, 1944, "something snapped" at work. "My brother's face came to my mind, and everything just went. My head became a complete blank, and all vision of my mind went instantly. I looked round and everything seemed unreal." She ran home in a panic and experienced fears of insanity. The symptoms persisted, and eventually she spent three months in a rehabilitation centre where she received eight electric convulsion shocks and a course of modified insulin and narcosis without success.

She was first admitted to Sutton in June, 1945, when she described herself as a robot, outside herself and everything, and that her head was empty and hollow yet filled with thoughts. "When I close my eyes I can think, but nothing comes. Familiar things do not seem familiar and have no meaning. I have to hang on to the feeling as to how I should feel. Nothing means anything any more." Her chief complaint was inability to visualise, and she also complained of change in the sense of time. "Time is just a space. . . . Everything is just a blank space. . . . Time is meaningless." She was intensely anxious and agitated, but derived no benefit from psychotherapy, vasodilators, vitamins, amphetamine, epanutin, and narco-analysis.

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She made efforts to go out and mix after discharge from hospital; and, though she gained weight and slept better, the sense of "blindness" continued. Her thyroid was investigated, but no operation was advised, and a further limited course of psychotherapy had no effect.

Her condition deteriorated, and she was readmitted in September, 1946, feeling desperate, hopeless, and unable to carry on. She wrote a list of seventeen groups of symptoms, predominantly those of depersonalisation, and looked a lonely picture of dejection and depression. Among her numerous descriptions of her strange and unreal state was the comparison of herself to "a broken camera with the lens out of focus." Excitatory abreactions under ether were attempted, using her traumatic experiences of her brother as the trigger stimulus, but despite a good deal of emotional release she felt no better.

Leucotomy was done by Mr. McKissock in December, 1946. Patient was restless, confused, irresponsive, and negativistic for several days after the operation, and had a grand-mal fit on the fourth day. During the second week her mental state became clear and she was brighter, said her symptoms were as before but did not distress her, showed no initiative, and ground her teeth.

She continued in the ensuing weeks to insist she was no different, though she was obviously cheerful, wrote letters that she had previously been unable to do, and admitted she was able to cope better with things. She was incontinent for several weeks. Her appetite improved, she was active in the ward, kept everybody in good spirits, and made many friends, whereas previously she sat about all day on her own. Gradually she volunteered the information that she was improving slowly, but she repeatedly said her mind remained blank and there was an inability to visualise.

Six weeks after the operation her father died suddenly, and she took it in an off-hand manner and was "surprised." Her attitude to her brother has completely altered, and she gets on well with him. "I don't worry about him. I don't worry about anything any more." She returned home two months after the operation, developed an enormous appetite, gradually lost her apathy, and found herself a job.

Her mother said patient was gradually improving, taking more interest in herself and surroundings, helping at home and visiting friends, and showed no signs of depression. Patient's periods became regular for the first time for some years.

Now, eight months after the operation, her mother expresses gratitude and the patient agrees the operation was well worth while, despite the fact that she still cannot visualise. She says this in an unconcerned fashion, and it is her only complaint.

This is a case of a chronic obsessional rendered completely useless by the symptoms of a severe depersonalisation state. All symptoms have been relieved by the operation except an inability to visualise, but this causes her no concern. It is only eight months since the operation; hence one cannot tell if that symptom too will disappear.

Case 5.—A woman, aged 32, admitted to hospital in January, 1947, complained that a feeling of unreality had suddenly descended on her like a cloud nearly three years previously and persisted unchanged.

Her father is described as normal except for an "obsession" about making money, and her mother is moody and quick-tempered. Patient is one of dissimilar twins, and the parental affection was said to have been lavished on her prettier sister. The twins got on well together. She had an excellent scholastic record, and was popular, good at sports, and head girl for two years.

She became a student teacher, but her career was soon interrupted by a sudden attack of depersonalisation, with associated phobias, at the age of 18. This lasted nine months, six of which she spent as a voluntary patient in a mental hospital.

Her upbringing at home had been strict, and discussions on sex were taboo; the attack of depersonalisation followed an incident two months earlier, when a man had exposed himself to her in a wood. After a spontaneous recovery she had remained well for three years, when the symptoms of depersonalisation recurred.

This second attack lasted three years, in the course of which she had spells in two mental hospitals. Eight cardiazol convulsions had no beneficial effect. She became engaged during the illness but terminated this later on, and she then experienced considerable guilt over illicit sex relations with a few men.

She married a regular Army officer after recovering from the second breakdown, and they have two children. When well she is said to be energetic, capable, keen on sports and reading, houseproud, conscientious, and liable to phobias.

Patient continued well until 1944, when her husband was posted to India. She was very upset over this; and, after he left, another attack of depersonalisation came on suddenly in the street. "Everything altered and became unreal. A blackness came down, and from that moment everything was centred on self." She became tense, anxious, and depressed, sat about and cried most of the day, and eventually spent six months in a private mental hospital. There she received eight electric convulsion shocks, but without any effect on the feelings of unreality, though the depression eased.

Her husband returned from India in October, 1945, on compassionate grounds; but, since her distress continued, she returned to the mental hospital and had a further seven electric convulsion shocks, again without benefit.

She next received treatment from an unregistered practitioner but had to be admitted to another mental hospital early in 1946, since she felt unable to carry on and was considered suicidal. Here she was given twelve cardiazol fits. The treatment had to be interrupted for a time after the sixth convulsion because of a dislocated shoulder. She left the mental hospital in a pitiful state, visited several consultants, and was finally referred to Sutton.

On admission she had a forced smile, talked freely without retardation, but was preoccupied with obsessional thoughts, mainly of suicide, and most of her conversation consisted of self-accusations and descriptions of her unreality.

Ether abreaction over her fears of insanity and her husband's infidelity before the onset of her illness led to some emotional release without corresponding improvement. Further attempts, using other incidents, also failed.

Her condition deteriorated, despite the fact that she put on 2 st. in weight with modified insulin treatment. She repeatedly asserted that she did everything mechanically, had no feeling, nothing registered in her mind, and she begged for an operation to relieve her suffering, or her suicidal impulses would prove to be too much for her.

Mr. McKissock operated on her on March 3, 1947. She reported an immediate easing of tension. For some days she complained of a headache, appeared drowsy, and said she felt lazy; but, almost as soon as her mental state was clear, she declared that her unreality had gone.

A week after the operation she was cheerful, happy, and free from complications, and said: "I feel normal; everything is real; I could not contemplate before that I could feel well again." She rapidly adjusted to a normal existence, returned to her home in a fortnight, and took over full household duties.

When seen two months after the operation she had returned from an energetic sporting holiday in Switzerland, said she felt fine, had regained her normal weight, and had no problems. Her husband and relations are delighted with the result. This happy state still exists, five months after the operation.

This case of depersonalisation of nearly three years' duration, like case 2, showed an immediate response to leucotomy after exhaustive and intensive alternative methods of treatment had failed.

DISCUSSION

Before the indications and value of prefrontal leucotomy in severe and long-standing depersonalisation can be assessed a larger series is necessary, and the patients will require observation after operation over longer periods than those cited in the case-records. Nevertheless certain facts stand out. The syndrome is not infrequently met with, and, though some patients recover spontaneously, a study of the histories reveals the utter misery experienced. They drift from hospital to hospital, often spending long periods in mental hospitals, and are keenly aware of the abnormality of their symptoms. They also have the utmost difficulty in describing their symptoms and in being understood.

A sufficient indication of the mental distress often caused by this crippling disability is shown by the variety

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of treatments to which the patients submit, and the results obtained with such treatments, as seen in a study of the case-records, only serve to emphasise the difficulty in ameliorating their symptoms. The 5 patients cited have received a total of 25 cardiazol fits and 50 electric convulsion shocks. Convulsive shock therapy is of little or no use; it may temporarily ease the accompanying depression, but the feelings of unreality remain or even become accentuated. In fact, some patients have become depersonalised during electric convulsion therapy, and case 3 became considerably worse after the third electric convulsion shock, and the treatment was discontinued. Of the 5 patients 4 lost their symptoms of depersonalisation after the operation (2 immediately and 2 after several months), and the fifth patient has improved and is still improving. The 2 who recovered immediately had had previous clear-cut attacks of unreality, whereas the other 2 had had a prolonged first attack which seemed to be going on indefinitely.

Though the present series is very small on which to base conclusions, there appears to be a difference in response between the two clinical groups. On the other hand, it may well depend on the position of the incision and the amount of white matter severed at operation.

Psychotherapists and psycho-analysts, such as Schilder (1939) and Oberndorf (1941), have commented on their generally poor results in the treatment of the depersonalisation syndrome. Our patients have not had prolonged systematic psychotherapy, but they have had this form of treatment to the limits of practicability.

A few striking successes have been obtained by excitatory abreaction under ether and more recently by the use of pentothal combined with intravenous 'Methedrine.' Patients, therefore, that might have come to leucotomy have been spared the operation. But this is only an occasional result.

Though there is an abundant psychopathology in the cases here recorded it has had to be omitted in this paper, as also the results of special investigations, such as the Rorschach personality assessments. Intelligence tests carried out before and after operation in all these cases demonstrate that there is no intellectual impairment.

Papers on leucotomy have recently emphasised the deterioration in some personality traits after operation (Hutton 1947). Such patients have usually come from mental hospitals. The findings have been less pronounced and less often met with in the material of this neurosis centre with, generally speaking, patients of comparatively good personality showing little deterioration before operation, and it is this type of case with which we are concerned.

I wish to thank Dr. Louis Minski, medical superintendent, for his kind permission to publish, and Dr. William Sargant for his helpful advice and criticism.

OPERATIVE TECHNIQUE

(Wylie McKissock, M.S. Lond., F.R.C.S.)

The technique used was that described by McKissock (1943) with only minor modifications. Burr-holes are made 3 cm. behind the lateral margin of the orbit and 5 cm. above the zygoma through 2 cm. skin incisions. The openings in the dura are large enough only to expose an area of cortex free from blood-vessels. A brain needle is inserted to a point 0·5 cm. short of the midline, the needle being angulated slightly forwards to avoid the anterior horn of the lateral ventricle. The needle, with stylet withdrawn, is then swept upwards and is, at the same time, introduced more deeply to an extent of 2–2·5 cm. to cut a line parallel with the falx, and finally outwards to divide as much white matter as possible. It is then reintroduced in the original plane, swept downwards until just above the orbital plate, and finally swept outwards across the orbital plate to divide most of the white matter in this situation.

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EFFECT OF STILBŒSTROL ON MOUSE TUMOURS

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THE occasionally favourable though transitory response of cancers of the human breast to treatment with stilbœstrol (Haddow et al. 1944) suggested the desirability of investigating the action of this œstrogenic compound on different types of malignant growths. Various tumours have been maintained by transplantation in mice of inbred strains for the purpose of testing compounds for chemotherapeutic activity (Ludford 1945), and ten tumours were used to investigate the action of stilbœstrol. Altogether 163 mice were treated, and there were 81 controls.

Treatment was carried out by inserting stilbœstrol in the form of pellets into the subcutaneous tissues. The first pellet was inserted either at the time of transplantation or when it was obvious that the tumour graft had begun to grow—i.e., 7–14 days after transplantation, according to the intrinsic growth-rate of the tumour. The dose of stilbœstrol was 1·5–6·0 mg. With smaller doses a second pellet was inserted 10–14 days after the first.

It was found that the amount of stilbœstrol tolerated depended on the genetic constitution of the mice. Those of the C57 and A strains were decidedly more sensitive to its toxic action than were R III mice. A similar difference in the sensitivity of these two strains to colchicine has been observed (Ludford 1947).

The following were the tumours selected for treatment:

C57 Low Mammary Cancer Strain, Black Mice

(1) A mammary carcinoma originally induced by cross-suckling with an A-strain female. This tumour was of an adenocarcinomatous type. The 18th-generation transplants were used.

For comparative purposes the growth-rate of this tumour has been arbitrarily chosen as unity (fig. 1). The figure in parentheses after each of the other tumours listed below gives approximately its comparative rate of growth.

(2) A squamous-celled carcinoma ($1^2/_3$) which arose spontaneously. The 13th-generation transplant was used. At this stage sections exhibited very little keratinisation.

A-Strain of Strong with High Incidence of Mammary and Lung Cancer, Albino Mice

(3) A carcinosarcoma ($2^1/_3$) which originated spontaneously as a mammary carcinoma. During the course of serial transplantation the stroma underwent sarcomatous transformation, and both sarcomatous and carcinomatous elements persisted throughout subsequent transplantations (Ludford and Barlow 1944, 1945). The 31st-generation transplants were used.

Histologically the tumour consisted of compact masses of carcinoma cells surrounded by sarcoma cells forming a highly cellular stroma.

(4) A polymorphic-celled sarcoma ($2^1/_3$) which originated by the sarcomatous transformation of the stroma of a mammary carcinoma. The 26th- and 55th-generation transplants were used.

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(5) A transplantable lung carcinoma ($^1/_3$) which arose spontaneously in an old male mouse. Lung tumours of the A strain are generally regarded as of alveolar origin (Lorenz et al. 1946). The 13th-generation transplants were used.

Histologically the tumour consisted of large compact groups of epithelial cells, often arranged in alveolar fashion and separated by a narrow stroma.

(6) A rapidly growing mammary carcinoma of spontaneous origin (3). The primary tumour was accompanied by numerous lung metastases. Histologically it was of the medullary type. The 15th-generation transplants were used.

R III or Paris Strain of Dobrowolskaja Zawadskaja with a High Incidence of Mammary Cancer, Albino Mice

(7) A medullary mammary carcinoma (2) characterised histologically by the relatively slightly developed stroma. The 41st-generation transplants were used.

(8) A medullary mammary carcinoma ($2^1/_2$) with a much more extensive stroma. The 7th-generation transplants were used.

(9) A spindle-celled sarcoma (3) which originated in the stroma of a mammary carcinoma. The 26th-generation transplants were used.

C3H High Mammary Cancer Strain, Brown Mice

(10) A medullary mammary carcinoma ($1^2/_3$) with poorly developed stroma. The 15th-generation transplants were used.

RESULTS

None of these tumours exhibited a specific sensitivity to stilbœstrol treatment. Dosages which did not impair the health of the mice had no appreciable action on the rate of growth of the tumours. Tumour growth was inhibited only in mice suffering from the toxic action of stilbœstrol, which was accompanied by considerable loss of weight. Below are given the protocols of two experiments illustrating the general results of this investigation.

Experiment Demonstrating Inhibition of Tumour Growth with Toxic Doses of Diethyl-Stilbœstrol

Mammary carcinoma no. 1 was transplanted into the left flank of 16 mice of the C57 black strain. Fourteen days later a 2 mg. pellet of diethyl-stilbœstrol was inserted into the right flank of 8 of the mice, and a similar dose was administered again on the 24th day. Each mouse was weighed every time the tumours were charted. Fig. 1 shows the rate of growth of the tumours, and the figures after the last charting give the percentage gain (+) or loss (−) in weight since the first charting on the 13th day. From fig. 1 it is obvious that there was a considerable inhibition of tumour growth in the treated mice, but this was accompanied by a great loss of weight. The mice were extremely emaciated, and most of them ultimately died.

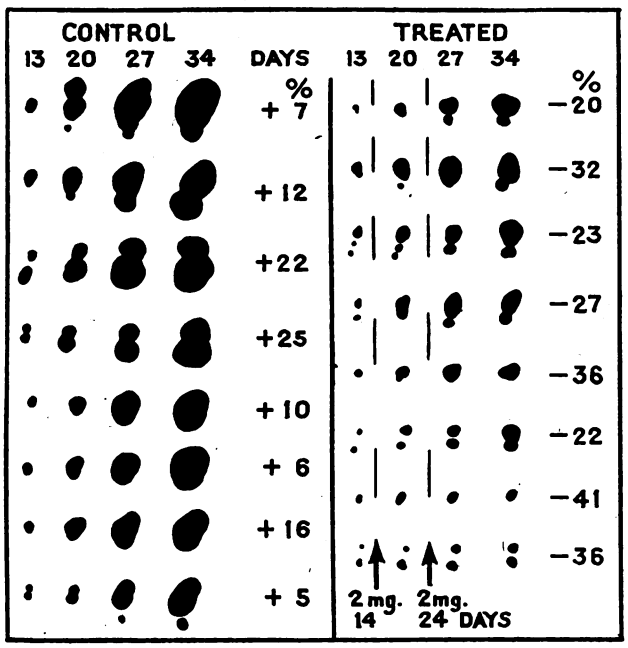

Fig. 1—Inhibition of growth of mammary carcinoma in C57 mice by toxic doses of stilbœstrol.

It was repeatedly observed during this investigation that, though tumour growth was inhibited when animals became ill, their tumours began to grow again at the normal rate if they recovered. Sections of tumours from treated animals such as those charted in fig. 1 exhibited no specific degenerative changes. There were very few mitoses. A greater proportion than usual were metaphases, suggesting some delay in anaphase separation of the chromosomes. There was no indication of a specific mitotic poisoning of the type induced by colchicine.

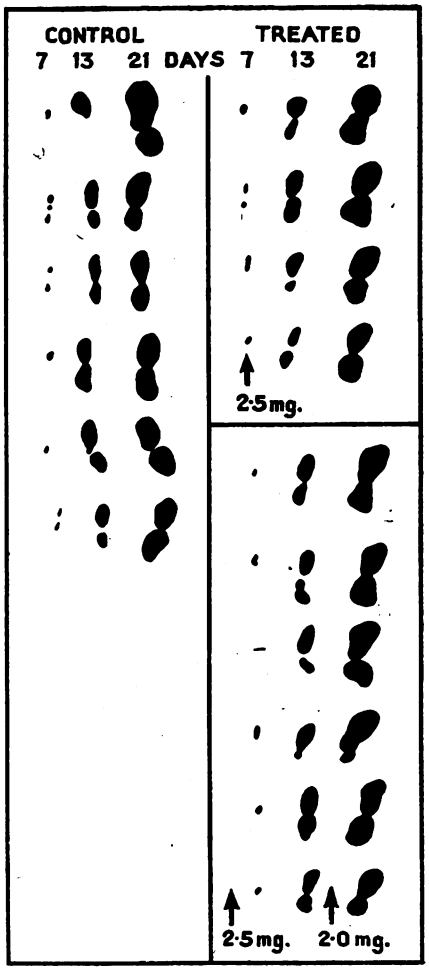

Fig. 2—Non-inhibition of growth of mammary carcinoma in R III mice by stilbœstrol in the absence of toxic symptoms.

Experiment Demonstrating that Diethyl-Stilbœstrol does not Inhibit Tumour Growth in the Absence of Toxic Symptoms

Mammary carcinoma no. 7 was grafted into 16 mice of the R III strain, of which 6 were kept as controls and the remainder received 2·5 mg. pellets of diethyl-stilbœstrol on the 7th day; 6 of these received a second pellet of 2 mg. on the 17th day. Fig. 2 shows there was no inhibition of tumour growth. All the mice increased in weight, and the average gain in weight of each of the three groups was about the same. It will be observed that 6 of the mice in this experiment received 0·5 mg. of stilbœstrol more than the C57 black mice of the other experiment (fig. 1). Yet the R III mice tolerated this larger dose without the appearance of toxic symptoms. Obviously, genetic constitution is an important factor in determining sensitivity to stilbœstrol.

It has been reported by Lettré (1943) that diethyl-stilbœstrol applied to tissue cultures of chick fibroblasts in a dilution of 100 µg./ml. has a mitotic poisoning action similar to that of colchicine. The photomicrographs illustrating Lettré's paper show numerous rounded cells in treated cultures, but it is impossible to distinguish whether these are arrested mitoses or

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"resting" cells which have become rounded off in the presence of a toxic substance. We therefore considered it desirable to carry out some experiments with tissue cultures to see if results comparable with those induced by colchicine could be obtained with stilbœstrol.

Lettré dissolved the stilbœstrol in alkaline solution, whereas we dissolved it in liquid paraffin and also used colloidal solutions. We had the further opportunity of testing a water-soluble phosphate derivative for which we were indebted to Prof. E. C. Dodds, F.R.S. Various concentrations of each preparation up to lethal dosages were applied to cover-slip cultures of embryonic and mammary-tumour tissue (mouse carcinoma 63). No indication was obtained of a specific action on the cancer cells, and no mitotic poisoning action was seen comparable with that of colchicine or its active derivatives.

DISCUSSION

This investigation was not carried out with the idea of contributing in any way to our understanding of the mode of action of stilbœstrol on prostatic cancer. We were concerned with the wider question, whether stilbœstrol has a specific action on the growth of malignant cells as such, either in vivo or in vitro. On the tumours used in these experiments stilbœstrol exhibited no specific inhibition of growth. Such inhibition of growth as took place with relatively high dosages was the result of a non-specific toxic action.

Further, our results do not confirm Lettré's (1943) contention that stilbœstrol has the same kind of mitotic poisoning action as has colchicine. Colchicine has a dual action on tumours: (1) it brings all cell division to a standstill at the metaphase by preventing the formation of the mitotic spindle (colchicinic mitosis); and (2) it induces hæmorrhage in rapidly growing tumours. Evidence has been adduced that such inhibition of tumour growth as can be induced by colchicine is primarily the result of hæmorrhage (Ludford 1947). In our experiments with stilbœstrol the characteristic cytological action of colchicine was absent, and a degree of intratumoral hæmorrhage sufficient to lead to tumour regression was never induced. There is no justification for including stilbœstrol in the same class of mitotic poisons as colchicine and sodium cacodylate, which both have such a pronounced action on the mitotic spindle (Ludford 1936).

SUMMARY

The action of diethyl-stilbœstrol has been investigated on ten different transplantable mouse tumours in mice of four inbred strains (C57 black, Strong A, R III, and C3H). These tumours included different types of mammary carcinomas: a carcinosarcoma, a squamous-celled carcinoma, a lung carcinoma, and two sarcomas.

On these tumours stilbœstrol showed no specific inhibition of growth; such inhibition of growth as took place with relatively high dosages was the result of a non-specific toxic action.

Neither in vivo nor in vitro did stilbœstrol induce the same type of mitotic poisoning action as does colchicine.

Genetic constitution is a significant factor in determining sensitivity to the toxic action of stilbœstrol.

We are indebted to Prof. W. E. Gye, F.R.C.P., F.R.S., for helping us to complete this investigation, which was begun when we were members of his staff.

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AUSCULTATION IN ACUTE ABDOMINAL DISEASE

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DURING the war surgeons came to regard abdominal auscultation as a very important part of the clinical examination of a patient with an abdominal wound; for often morphine had minimised signs such as tenderness and rigidity. In civilian practice, however, auscultation is commonly omitted from an abdominal examination.

In the "acute abdomen" auscultation is useful in showing whether peristalsis is present or not. The fluid splash of distended loops of intestine moving on respiration must not be confused with the sounds of peristalsis. The splash can be reproduced by rolling the patient and listening at the same time. With experience there is no difficulty in differentiating the two sounds.

If the sounds of peristalsis are heard over the whole abdomen, further auscultation is unnecessary; but, if they are locally or entirely absent, further examination is required. The absence of sounds cannot be established immediately; auscultation should be done several times for 2 or 3 minutes at a time until the presence or absence of peristalsis has been confirmed beyond doubt. Even the normal abdomen may be silent for considerable periods.

RESULTS

The results of such auscultation in 250 patients with an acute abdominal catastrophe, and in 150 war wounds of the abdomen, are given in tables I and II. These figures show that auscultation is of little value in the early case of acute appendicitis, but of considerable help once a local or general peritonitis has developed. Silence on abdominal auscultation is pathognomonic of peritonitis, though it is of less value in the differentiation of its cause. The following case illustrates the importance of abdominal auscultation in such patients:

TABLE I—FINDINGS ON ABDOMINAL AUSCULTATION IN 250 CASES OF ACUTE ABDOMINAL DISEASE

Diagnosis (established at operation)	No. of cases	Peristalsis present over whole abdomen	Local silence round lesion	Peristalsis absent over whole abdomen
Acute appendicitis without perforation	124	114	10	0
Local peritonitis (perforated appendix, leaking peptic ulcer, &c.)	36	10	26	0
Pelvic peritonitis (perforated appendix, salpingitis, &c.)	14	1	13	0
General peritonitis (perforated peptic ulcer, perforated appendix, &c.)	36	0	8	28
Intestinal obstruction without strangulation	16	16	0	0
Intestinal obstruction with strangulation	12	7	2	3
Hæmoperitoneum (ruptured ectopic gestation, ruptured spleen, &c.)	6	6	0	0
Intraperitoneal rupture of urinary bladder	3	3	0	0
Acute hæmorrhagic pancreatitis	2	0	0	2
Bile peritonitis	1	0	0	1

A young police constable was admitted with 24 hours' history of generalised abdominal pain. On examination the

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whole abdomen was rigid and tender. A perforated peptic ulcer was suspected, but abdominal auscultation revealed peristalsis in the epigastrium and silence in the hypogastrium. This led to a diagnosis of perforated acute appendicitis, which was confirmed at operation.

In this patient the information obtained by abdominal auscultation enabled the incision in the abdominal wall to be located correctly.

Intestinal obstruction without strangulation produces a great increase in peristalsis. Once strangulation has taken place, however, sounds of peristalsis may disappear. This is of particular interest if the cause of the strangulation is not an external hernia. The present series includes 3 such patients with a complete absence of abdominal peristalsis. In these patients abdominal auscultation helps in deciding whether intestinal strangulation has taken place, which is of great importance now that a more conservative attitude to simple intestinal obstruction is customary. The following case illustrates this point:

TABLE II—FINDINGS ON ABDOMINAL AUSCULTATION IN 150 ABDOMINAL WOUNDS [1]

Lesion of hollow viscus	Peristalsis present	Peristalsis absent over whole abdomen
Present	6	92
Absent	51	1

A soldier was admitted with 18 hours' history typical of intestinal obstruction due to adhesions from an old abdominal wound. Peristalsis was increased, and he was treated by intestinal suction and intravenous saline, followed by recovery. Just before his discharge from hospital a second attack developed. This time his pain was continuous and his abdomen rigid, with complete silence on auscultation. Intestinal obstruction with strangulation was diagnosed and confirmed at operation, when a volvulus of the small intestine was found and the strangulation was relieved.

An uncomplicated hæmoperitoneum was present in 22 war wounds and 6 other patients in the present series. In every case sounds of peristalsis, though sometimes faint, were heard—a very valuable aid in the differentiation of this condition from peritonitis. An intraperitoneal rupture of the urinary bladder was found to be the only intra-abdominal lesion in 5 war wounds and 3 other patients, and again sounds of peristalsis were heard in every one. Acute hæmorrhagic pancreatitis, or free bile in the peritoneum, has produced complete silence on auscultation.

During convalescence the first return of peristalsis after a period of silence is a point worthy of note, because it is often the first indication that gastric or intestinal suction may be discontinued.

SUMMARY

In 250 patients with an acute abdominal emergency, and 150 patients with an abdominal wound, abdominal auscultation has provided valuable diagnostic data.

The absence of peristalsis can only be established by long and repeated periods of abdominal auscultation.

In this series intestinal peristalsis was abolished by the presence, in the peritoneal cavity, of intestinal contents, pus, bile, hæmorrhagic exudate from strangulated intestine, and exudate from an acutely inflamed pancreas. It was not abolished by the presence of blood or of urine in the peritoneal cavity.

Confirmed silence on abdominal auscultation, whether local or general, is a positive sign of peritonitis and a valuable aid to the diagnosis and localisation of an acute abdominal lesion.

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RUPTURE OF RECTUS ABDOMINIS MUSCLE DURING PREGNANCY

REPORT OF TWO CASES

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SPONTANEOUS rupture of the rectus abdominis muscle is a rare complication of pregnancy, usually undiagnosed before operation, though the signs and symptoms are so constant that diagnosis should be easy.

Torpin (1943) collected 27 cases published since 1900 and added 1: 25 were in multigravidæ and 3 in primigravidæ; and 15 occurred after the strain of severe coughing, 5 during that of labour, 2 after a fall, and 1 during labour complicated by typhoid fever. In 5 cases the history was incomplete. There were 4 deaths: 2 from hæmorrhage and shock, 1 from post-operative pneumonia, and 1 in which the cause was not stated. The earliest cases occurred at 18 weeks' pregnancy. In 3 early cases the patients aborted, and there were 4 stillbirths. In 4 cases the condition was diagnosed and treated conservatively; all these patients recovered. Blood-clot was evacuated in 17 cases, 2 of the patients also having cæsarean section. After this method of treatment 2 patients died, 2 aborted, and 9 recovered; in 4 cases the result was not stated. In 1 case treatment was by cæsarean section only, and the patient recovered.

Of 2 cases reported by Fahmy (1944) the first was treated by evacuation of clot and the pregnancy continued to term; and in the second a small swelling below the right subcostal margin was at first diagnosed as acute cholecystitis and subsided without treatment.

Thomas (1943) reported 1 case which he diagnosed as concealed accidental hæmorrhage and treated by rupture of membranes, followed by application of Willett's forceps, and finally by cæsarean section, two pints of blood-clot in the right rectus muscle being evacuated incidentally. The patient recovered. Thomas (1945) summarised Torpin's (1943) cases and published a further case. This patient was diagnosed on admission to hospital and was at first treated conservatively. Bleeding increased during rest and necessitated operation, at which it was found that the bleeding was from a branch of the deep epigastric artery, which had to be ligated. The patient came into labour spontaneously a few days later and was delivered of a stillborn infant. She made an ultimate recovery.

Dawson (1944) reported 1 case, which was treated by cæsarean section, the hæmatoma being left to subside. This patient also made a good recovery.

The present cases may be of interest to add to the list.

Case 1.—A woman, aged 41, who had had one previous pregnancy in 1938, associated with "kidney trouble," but terminating in a normal delivery of a healthy infant weighing 6 lb. 4 oz., was first seen at the clinic on Aug. 10, 1946. Her last monthly period had been on May 10, 1946.

On examination: a pale woman in poor general condition, breathless on exertion. Heart and lungs normal. Blood-pressure 166/108. Abdomen soft. Uterus just palpable above symphysis.

Investigations.—Blood-count: red cells 4,550,000 per c.mm., Hb 94%, colour-index 1·0. Urine: no red cells; a few leucocytes; no casts; many gram-positive cocci; no albumin. Intravenous pyelography showed calcified abdominal glands; anatomy and function of each kidney normal.

Patient was admitted for rest, and at the end of a week the blood-pressure fell to 130/90. She was regarded as a case of essential hypertension, and was seen every month at the antenatal clinic. Her blood-pressure remained about 140/100 until the thirtieth week, when it rose again to 160/110. At this stage the patient developed a severe attack of bronchitis and was in bed at home for a fortnight.

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On Jan. 1, 1947, she was readmitted with a history of sudden acute abdominal pain, with vomiting. She was acutely ill, in severe pain; temperature 99·8°F, pulse-rate 120, respirations 20. Rhonchi over both sides of chest. Heart normal.

Abdomen showed two large swellings. One of these was the uterus, pushed over to the right side. The fundus corresponded to 34 weeks' gestation, fœtal parts were easily felt, and the fœtal heart was heard.

The other swelling rose from the level of the symphysis pubis to 2 in. above the umbilicus on the left side. It was acutely tender, and there was paræsthesia of the skin over the tumour. Further examination was impossible without anæsthetic, but provisionally a twisted ovarian cyst or hæmorrhage into a fibroid was diagnosed.

Operation.—Patient was taken to the operating-theatre and anæsthetised. A left paramedian incision was made, and a rupture of the left rectus abdominis was immediately found. The anterior fibres of the rectus were intact, but the deep fibres were completely disintegrated in the middle third of the muscle. About 4 oz. of blood-clot was evacuated, and a gauze pack was inserted into the cavity before the wound was closed. The peritoneal cavity was not opened.

Patient's condition improved, though a severe cough remained. Next day the pack was removed under nitrous-oxide anæsthesia, and a small rubber drain was substituted.

A fortnight after operation the wound was healed, and there was very little abdominal tenderness. Blood-count: red cells 4,300,000 per c.mm., Hb 75%, colour-index 0·9. No acid-fast bacilli in sputum.

Labour.—On Jan. 15, 1947, abdominal pain was again complained of, but this pain resembled the onset of premature labour. Before the complication of ruptured rectus had arisen, induction of labour at 36 weeks had been advised because of the presence of essential hypertension.

The fœtus was lying as a breech, and the abdomen, though healed, was still rather too tender for external version without anæsthesia. 'Pentothal' was given, and external version performed, followed by surgical rupture of membranes. Normal delivery followed 2 days later after a labour of 19 hours. The infant weighed 5 lb. 8 oz. and was healthy.

The puerperium was uneventful, and abdominal massage and movement was started on the second day after delivery. Mother and infant were discharged to a convalescent home on Jan. 31.

Case 2.—A woman aged 34, who had had three previous labours, all normal. Her last monthly period had been in July, 1946, and the expected date of delivery was April 30, 1947. She was admitted on March 13.

She had had a cough for a week, and vague abdominal pain during pregnancy, but acute for 4 days—i.e., since onset of cough. Pain confined to left rectus. No vomiting; no urinary symptoms.

On examination: general condition fairly good, except for bronchitis. Heart normal. Pulse-rate 116. Blood-pressure 124/80. Fundus uteri corresponded in position to that of 34 weeks' pregnancy. Fœtus in L.O.A. position, high. Fœtal heart heard.

Circumscribed area of tenderness in left rectus abdominis muscle, just above umbilicus, with small very painful swelling. Much hyperæsthesia of skin over left side of upper abdomen. Treated by rest, abdominal binder, sedatives, and linctus.

March 21: "show," no pains, fœtus lying transversely. *Examination under anæsthesia:* edge of placenta felt high up, dipping into lower segment; artificial rupture of membranes; swelling in left rectus felt easily under anæsthesia.

March 24: normal delivery, infant weighing 5 lb. 8 oz.

Puerperium apyrexial; pain still present but gradually diminishing.

March 29: swelling about the size of a hen's egg but much less tender. Mother and child discharged, healthy.

COMMENT

The similarity of symptoms in many of the reported cases suggests that a typical case of ruptured rectus abdominis in pregnancy is characterised by multiparity; cough; acute abdominal pain, with shock; uterus normal in size for dates, and fœtal parts easily felt; painful swelling to one side of uterus and sometimes sufficiently large to displace uterus to one side; and hyperæsthesia of skin over affected side, as tested by drawing a pin across the abdominal wall.

(*References at foot of next column*)

FATAL HÆMORRHAGE IN ABERRANT LUNG TISSUE

REPORT OF A CASE

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ABERRANT lung tissue has mainly been the concern to date of anatomists, and most of the world's literature on the subject of dissociated segments and aberrant or supernumerary lungs and lobes of lung deals with the subject from the developmental and anatomical point of view. In the present case death resulted within two hours from hæmorrhage.

A sergeant, aged 28, was admitted to the medical wards of a British General Hospital in C.M.F. on Jan. 26, 1946, with two days' history of sore throat.

His tonsils were enlarged and injected, but no exudate was present. A course of sulphathiazole was started at once. A throat swab gave a moderate growth of *Strep. pyogenes.*

By Feb. 4 a left peritonsillar abscess was forming. Sulphathiazole was discontinued, and intramuscular penicillin 15,000 units 3-hourly was given. His temperature remained high and his general condition poor. On the 8th he appeared to have septicæmia. White-cell count 15,000 per c.mm. (polymorphs 76%, lymphocytes 18%, monocytes 6%). Urine normal. A second course of sulphathiazole was started and penicillin injections were continued.

On the 11th he had a brisk epistaxis. Temperature 103°F. On the 12th œdema of the left side of the face with left cervical adenitis appeared, and he had a further epistaxis. No abnormal physical signs in heart, lungs, or abdomen. On the 15th at 9 A.M. he had a sharp pain in the left side of the chest, worse on breathing and poorly localised. Percussion note impaired at left base, with faint breath sounds and no adventitious sounds.

At 10 A.M. his condition suddenly became much worse, the pulse-rate rising rapidly from a slow normal of good volume to a thin but regular 130–140 per min. The patient was seen by Major W. A. L. MacFadyen, R.A.M.C., medical specialist, who found blood-pressure 55/20 mm. Hg, slight œdema of the legs, and a clinical picture strongly suggesting internal hæmorrhage. A plasma intravenous drip was started but the patient died at 11 A.M.

Necropsy, performed that afternoon, showed the body of a pale well-built young man. Spleen slightly enlarged, its cut surface pale and its substance softer than normal. Early degenerative change in liver. Left pleural cavity full of blood and recently formed blood-clot, about 4 pints in all.

A tumour 4 in. × 3 in. × 2 in. was found posterior to and slightly to the left of the heart, attached to the mediastinum by a short narrow pedicle which broke on examination, so that its exact structure could not be ascertained. A ruptured aneurysm surrounded by blood-clot was found on the surface of the tumour. Lungs showed no inflammatory changes. Trachea and bronchus normal.

Major H. E. Hutchinson, R.A.M.C., reported on sections of the tissues as follows: "The section shows collapsed lung tissue with persistence of numerous bronchioles and blood-vessels. The picture is that of long-standing bronchiectasis, as evidenced by the extensive fibrous and round-cell infiltration. Areas of acute inflammation, hæmorrhage, and bronchiectatic ulceration are present, suggesting that this may have been the origin of the hæmothorax found at necropsy."

COMMENTS

The cause of death here appeared to be hæmorrhage into an aberrant left segment of the lung and into the

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adjacent pleural sac. No bronchus connected this lung tissue with the main bronchial tree, the pedicle broke readily on manipulation, and its exact attachments could not be ascertained. No large abnormal blood-vessels could be demonstrated. The infected nature of the aberrant lung tissue was in striking contrast to the unaffected parenchyma of the normal lungs.

Such aberrant lung tissue is usually discovered accidentally at necropsy, though some cases have been diagnosed on radiograms of the chest, and some discovered at operation.

Cockayne and Gladstone (1917) described several cases.

Gruenfeld and Gray (1941) collected 30 cases from the literature, 6 with coexistent diaphragmatic hernia: 27 were left basal, 3 right basal; 25 were above the diaphragm, 5 below. In one case the accessory lung was embedded in the left lower lobe.

Bert and Fischer (1911) found 4 of 17 cases subdiaphragmatic, 13 superdiaphragmatic. Only one of their cases was right-sided. The tissue was often cystic, varying in size from a hazel nut to a clenched fist.

Davies and Gunz (1944) state that in most cases the patients die at birth, and that the displaced lung tissue is unduly subject to disease—tuberculosis or bronchopneumonia.

Friedlander and Gebauer (1939) describe the aberrant tissue as usually rich in dilated bronchi, cysts often being lined with cuboidal ciliated epithelium. Cartilage is often absent or in irregular plates. Cystic change, they state, is sometimes so extensive that it is difficult to recognise the tissue as lung tissue.

Blair et al. (1946) published details of 1 case in a series of 5. In this case opaque oil outlined the dissociated bronchiectatic cavities when injected directly into the aberrant tissue, whereas normal bronchography had not revealed the affected area.

Pryce (1946) in a further paper described 7 cases with a lower accessory pulmonary artery running to intralobar sequestration of lung tissue. The arterial abnormality was unrelated to any cardiac malformation and was purely accessory, arising from the aorta near the diaphragm. The abnormal artery serving the dissociated segment was elastic and of systemic pulmonary type, and Pryce considers the abnormal artery to be the prior lesion. One of us (F. D. H.) has seen such a condition but no such large artery was found in the present case.

Though most cases, therefore, have been incidental discoveries, such aberrant lung tissue, shut off from the main bronchial tree, may present as lung abscess, bronchiectasis, or acute hæmothorax, and may be completely missed on straight radiograms and even on bronchography, the aberrant tissue not filling with oil. Hæmorrhage into a segment displaced below the left diaphragm may simulate a ruptured spleen. It is as well, therefore, to keep in mind this rare but occasionally fatal condition.

SUMMARY

A case of fatal hæmorrhage into aberrant lung tissue is described in a young man previously perfectly healthy.

Attention is drawn to the fact that such aberrant tissue is unusually liable to infection and hæmorrhage.

There being no connecting bronchus, manifestations of such complications may be difficult to interpret unless the condition is kept in mind.

Our thanks are due to Brigadier C. Smith, O.B.E., M.C., D.M.S. C.M.F., for permission to publish this article.

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Reviews of Books

The Biology of Schizophrenia

R. G. HOSKINS, M.D., PH.D. London: Chapman & Hall. 1946. Pp. 191. 15*s*.

FOR nearly twenty years Dr. Hoskins has been director of an ambitious research undertaking designed to throw light on schizophrenia. His approach to this disorder was physiological, with a bias towards endocrine study: but like others who have occupied themselves intensively with schizophrenia, he was driven to expand and divide it into a series of wide biological problems. The Biology of Man in Relation to Schizophrenia is presented in the first of the three sections into which the book is divided: the account is learned, thoughtful, and no more unsatisfying than one would expect of 60 octavo pages devoted to such a panoramic theme. The second part of the book describes, with many questions and comparisons, the pattern of schizophrenia. The third part is the most informative, since it tells what psychobiological findings the investigations of Dr. Hoskins and his colleagues yielded. They are modestly set out, and it is evident that they consisted of peculiarities rather than signs of a consistent abnormality: to some extent, however, they suggest that the schizophrenic cannot adapt well to changing stimuli. The book concludes with some vague and uninspired advice about the lines on which further research should proceed into schizophrenia; it is more likely that the development of new methods and knowledge in the basic sciences will be the condition of genuine progress, though the studies suggested might add to the already numerous inconclusive data about the illness.

Rehabilitation Through Better Nutrition

TOM D. SPIES, M.D., associate professor, department of internal medicine, University of Cincinnati. London: W. B. Saunders. 1947. Pp. 94. 20*s*.

Nutritional and Vitamin Therapy in General Practice

(3rd ed.) EDGAR S. GORDON, M.D., PH.D., associate professor of medicine, University of Wisconsin. Chicago: Year Book Publishers. London: H. K. Lewis. 1947. Pp. 410. 27*s*. 6*d*.

Professor Spies is a nutritionist who is himself responsible for a great deal of original and painstaking work in the clinical field, while Professor Gordon, though he too has done original work, writes chiefly as a clinician. Spies summarises the principles of diagnosis and treatment of nutritional deficiency diseases which he has adopted in his nutrition clinic at the Hillman Hospital in Birmingham, Alabama. He holds that the complete cure of nutritional deficiency, so as to make the patient fit for work, requires careful diagnosis and energetic treatment if an indefinite prolongation of ill health and inefficiency is to be avoided. Since the founding of the clinic in 1936 over 10,000 patients have been seen. Of these, 893 severely ill patients are selected for special study as suffering from nutritive failure sufficient to prevent them from working, but able to be made completely fit for work by appropriate treatment. Most of them suffered from deficiency of the water-soluble vitamins, especially of the B-group. He gives an account of methods of diagnosis based on a study of the dietary history, physical examination, and response to dietary treatment, and summarises the salient features of deficiency diseases. Mild deficiency of some dietary factors often leads to vague symptoms and ill-defined signs, so that cases are often diagnosed as functional. Again, dietary deficiencies, especially of the B-group of vitamins, are almost always multiple, resulting in a variety of signs and symptoms and necessitating treatment with more than one dietary factor. Third, patients with chronic multiple deficiencies exhibit numerous differences in the manifestations of their disease, so that he writes: "Of the many thousands of patients I have examined, I have still to see two patients with identical manifestations." There is no sign of deficiency disease which of itself can be considered pathognomonic. Evidence must be sought from all sources—from the history of the diet and of the condition, from the symptoms and signs, and above all from the response to

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specific therapy. He lays greater stress on the signs which the ordinary clinician can elicit than on those special tests, such as estimation of the vitamin content of the blood, which are available only to the expert.

Principles of treatment are fourfold: conditions such as infections and hyperthyroidism, which increase the nutritional requirements, are alleviated or removed; any coexisting disease is treated; a liberal diet is prescribed; and, since such diets often cannot be consumed in the early stages of treatment, supplements of vitamin and yeast preparations are given. In this way, all the patients were improved to an extent which allowed them to resume work.

Dr. Gordon's book is a fine concise account of clinical nutrition for the practitioner. It describes the great advances in knowledge made in this young science and critically appraises the many beliefs based on less certain evidence. No-one reading this book will have any doubt as to which diseases warrant nutritional therapy and which will react disappointingly. There are first-class descriptions of the mode of action, results of deficiency, and indications for giving supplements of the vitamins and mineral elements, and of the rôle of protein, carbohydrate, and fat in the diet. Additional chapters describe the basis of weight control, the influence of nutrition on dental caries, and the economic aspects of nutrition. The book is fortunately not burdened with detailed tables of the composition of foods, though there is an appendix which contains as much of such information as would ever be required by the practitioner.

Electronics and Their Application in Industry and Research

Editor: BERNARD LOVELL, PH.D., F.INST.P., physical laboratories, University of Manchester. London: Pilot Press. 1947. Pp. 660. 42*s*.

THIS book will be very welcome to those who try to keep abreast of electronic applications either in laboratory work or industry or medicine. The chapters on electronics in medicine (Grimmett), electronics in physiology (Pumphrey), the betatron (Craggs), and electron microscopy and electron diffraction (Cosslett), are of interest to doctors, and are written by people who have all made significant contributions to their subjects.

Grimmett demonstrates his detachment when he says: "Radiotherapy is only a passing phase in cancer treatment, in the sense that it must sooner or later give place to biological methods of treatment. . . . The future may well show that the truly valuable contributions to medical science in this field are rather to be found in the fundamental knowledge which is being gained of the ultimate nature and structure of the cell." Pumphrey shows what a new era opened to physiology when the almost inertia-less electron became the prime recorder of electrical impulses. It is to be hoped that instrument-makers will note that "there is literally no equipment available for reproducing or recording sound in the range of 10–100 Kc./s." The first betatron to reach this country was operated at 4 M.e.v., but the article on this electron accelerator describes in some detail the construction of an instrument operating at 100 M.e.v. What the electron has done for vision is described by Cosslett with the aid of a superb set of photomicrographs taken by means of the electron microscope. Bacteriophage is here visible, in support of the imaginative flight of the French bacteriologists of a former decade.

Dr. Lovell, chief editor of the book, could hardly have selected his authors with more felicity.

The Child from Five to Ten (2nd ed. London: Hamish Hamilton. 1947. Pp. 475. 18*s*.).—This is a sequel to Dr. Arnold Gesell's earlier work, *Infant and Child in the Culture of Today*, and he has had the collaboration of Dr. Frances L. Ilg in writing it. Though it was compiled in the Yale clinic of child development, where so much careful observation has been put on record, the material is thin and much of it banal. The style can be illustrated at random: "EIGHT is coming out from his more serious, thoughtful inward self of SEVEN. Indeed, this new outer self seems to want to be constantly contacting people, going places, and doing things." "He may still have a lingering fear of the dark, and is said to be leery or shy of the dark." And so on. A general atmosphere of whimsy about the presentation, the illustrations, the quotations, and the use of exclamation marks is likely to leave the English reader cold. There may be a place for a book of this kind, but hardly on the busy practitioner's bookshelf.

New Inventions

RETRACTOR FOR OPERATIONS ON NUCLEUS PULPOSUS

THE retractors illustrated here have proved highly satisfactory in operations on the nucleus pulposus. They are modifications of the original idea described by Taylor,[1] and their principle is to use a fixed bony point on the skeleton as a fulcrum against which leverage can be exerted to retract the superjacent muscle. They

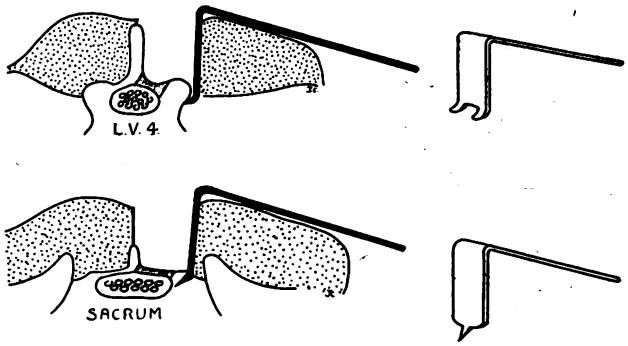

Fig. 1—Above: the retractor with two blunt hooks, used to retract the muscles from the spine above the level of the sacrum. Below: the retractor with a single sharp hook, used to retract the muscle overlying the sacrum. The spike is hammered into the bone with a mallet.

are most suitable for laminectomy in the prone position when they can be rendered self-retaining by attaching weights to their handles with sterile chains or bandage.

Experience has shown that two shapes of retractor are advisable in the exposure needed for hemilaminectomy. One of these retractors (fig. 1 above) is provided with two blunt hooks; this can be hooked under the bones of the vertebræ lateral to the posterior articulations, at the level of the 3rd, 4th, or 5th lumbar vertebra. The other retractor (fig. 1 below) is provided with a single sharp hook; this is required for retraction of the muscle superjacent to the sacrum, because at this site it is impossible to reach any lateral bony ridge under which a blunt hook could be lodged. At this site the spiked retractor is passed under the muscle and the terminal spike is driven into the smooth posterior surface of the sacrum by a few blows with the mallet; the handle of the retractor can then be depressed in order to retract the muscle (fig. 2). In this position both retractors can be rendered self-retaining by means of sterile cords or chains attached to the handle at the end of which a weight of about 3 lb. is secured. These retractors appear to assist hæmostasis during operation by the constant tension they maintain on the muscle.

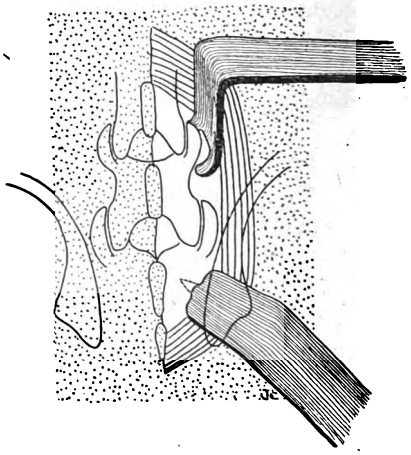

Fig. 2.—The two retractors in place.

They are made by Messrs. Down Bros. and Mayer & Phelps Ltd., of London.

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1. Taylor, G. M. *J. Bone Jt Surg.* 1946, 28, 183.

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THE LANCET

LONDON: SATURDAY, NOV. 15, 1947

Punishment and Reform

IF the new Criminal Justice Bill does not do all that students of criminal psychology might wish, it nevertheless does much; and it opens the way to further advances. Its general object is "to improve the methods of dealing with persons found guilty of offences, including adolescent offenders and persons who commit repeated offences." An early clause removes the legal distinction between imprisonment and penal servitude: "hard labour," which originally meant labour at the crank and the treadwheel, is to go, and the various prison "divisions" are to disappear. All sentences will become sentences of imprisonment, and during his stay in prison the offender will experience the sort of treatment—so it is intended—most likely to help him to reform. The chance of reformation will be extended, within limits, to persistent offenders, for whom two types of sentence are proposed: young adults with two previous convictions for serious offences may be ordered corrective training for a period of not less than 2 and not more than 4 years; but those over 30 who have had at least three such convictions, and whose reform is considered unlikely, may be ordered, for the protection of society, 5–14 years' imprisonment. The power of the courts to pass sentences of corporal punishment is to be abolished, though this method is to be retained for dealing with certain serious prison offences. The Cadogan Committee's figures conclusively demonstrated that corporal punishment does not deter, and that its effects are the opposite of reformative; and in the face of this plain evidence its abolition will hardly be opposed, unless by persons swayed by subconscious motives.

The sections of greatest interest in the Bill are those relating to young offenders. At present those over 17 are sent to prison when remanded or committed for trial; but the Bill proposes that State remand centres should be set up where people of 14–21 may be retained for this period. A court of assize or quarter sessions will no longer be able to sentence a person under 15 to imprisonment (the age is now 14); and a court of summary jurisdiction will not be able to imprison a person under 17. No court is to sentence anyone under 21 to imprisonment unless there appears to be no other way of dealing with him; and, if experience justifies these experiments, provision is made for raising the age at which a prison sentence may be received, and to prohibit, by Order in Council, the sentencing to imprisonment by summary courts of persons under 21. Furthermore, new institutions, known as detention centres, are proposed, to which people between 14 and 16 may be sent for 3–6 months. They are to be set up gradually throughout the country, and will provide an alternative to prison for the young offender who does not need training in an approved school or borstal, but whose offence is beyond the scope of a fine or a probation order. It is thought that in such cases a short period of brisk discipline and hard work may prove a deterrent.

The probation system, which has long proved its worth, is to be amended and simplified. The binding-over procedure is replaced by power to discharge an offender subject to the condition that he commits no offence for 12 months. In order that young offenders may be properly impressed with the gravity of probation, the Bill proposes that a conviction shall be recorded in every case before probation begins; but probationers, whether juvenile or adult, are still to be exempted from legal disabilities attaching in after life to a conviction. The minimum period of probation is to be a year. State financial help is proposed for probation homes (in which offenders are given resident training) and probation hostels (from which offenders go out to work daily). Such homes and hostels are at present all run by voluntary societies; the courts have power to require an offender to live in one while he is on probation, and the influence has proved valuable. The Bill proposes that the State shall maintain some homes and hostels of the kind; and that a sufficient number of probation officers shall be appointed for every area, as well as a woman officer for every petty sessional division. The plan, adopted in 1936, of admitting offenders up to the age of 23 to borstal institutions has not proved a success and is to be ended. Many of these older offenders are married, with children, and no doubt the method of treatment was hardly suited to their outlook and responsibilities. Provision is made, however, for the release on licence of young offenders sentenced to a term of imprisonment.

Some new arrangements are made for the care of mental cases. At present courts of summary jurisdiction can get a medical report on the mental condition of an offender by remanding him to prison; but the Bill provides that an offender can be remanded on bail with a provision that he submits to medical examination. If an offender is certifiable as insane the same courts are to have power to make an order for his reception in an institution for persons of unsound mind. The term "criminal lunatics" is to be replaced by "Broadmoor patients," and the responsibility for "Broadmoor institutions" is to be transferred to the Board of Control; though the responsibility for the discharge of their patients will remain with the Secretary of State.

The Government have not decided whether the time has come to reconsider the death penalty, and the decision here will be left to a free parliamentary vote. Another question that should be raised in debate is the need for change in the law dealing with homosexual offences, which is conspicuously archaic. Dr. EDWARD GLOVER [1] has indicated the legal injustice to which such patients are at present exposed; and Dr. ALEX COMFORT [2] has lately suggested the lines which such new legislation might follow. There is certainly room for discrimination between, in Dr. COMFORT's term, "the constitutional invert who conducts himself decently," and the type of homosexual offender who is a danger to others, because he is capable of sexual assault, the seduction of minors, or conduct offensive to public decency.

1. See *Lancet*, Nov. 1, p. 661.
2. *Ibid*, Nov. 8, p. 700.

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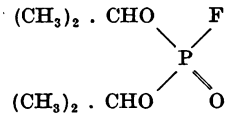
D.F.P.

ONE of the many compounds developed under the impetus of war is di-isopropylfluorophosphate (D.F.P.), which, though chemically unrelated to physostigmine or 'Prostigmin,' inhibits the cholinesterase of serum, red cells, muscle, and brain. Alkyl esters of fluorophosphoric acid were known in 1932 as substances forming toxic vapours capable of causing laryngeal, respiratory, and visual disturbances. But it was not until 1941 that MCCOMBIE and SAUNDERS [1] prepared D.F.P. and found it to be lethal if inhaled. ADRIAN et al.[2] and American workers observed that it is an inhibitor of cholinesterase, and that this inhibition is permanent and irreversible, whereas that produced by physostigmine is temporary and reversible and also less potent.

A colourless oily liquid with a specific gravity of 1·055 and a solubility of 1·54% in water at 25°C, D.F.P. has the structural formula :



In aqueous solution it is unstable, undergoing half-hydrolysis in 16 hours. For clinical use it may be prepared as a 0·1% or 0·2% solution in peanut oil; this may be autoclaved and retains its potency for at least a year. In this concentration it has no local irritant effects when injected intramuscularly or applied to the eye. It is moderately volatile and has little smell even at toxic concentrations. Since it is only slowly detoxified, those who have been exposed to the vapour should avoid it for several weeks afterwards, even though only mild symptoms may be produced, such as pupillary constriction, chest pains, nausea, or diarrhœa.

Like physostigmine, D.F.P. inhibits both true cholinesterase and pseudo-cholinesterase,[3] but it is true cholinesterase that hydrolyses the acetylcholine released at nerve-endings, and it is therefore the degree of this inhibition which is significant for correlation with pharmacological action. The pharmacological effect of D.F.P. is related to the inhibition rather of red-cell cholinesterase than to that of serum or tissue esterases. It differs from prostigmin, and resembles physostigmine, in being a central excitant; after intravenous or intrathecal injection the knee-jerk is enhanced, but the most striking effect is on the after-discharge, which is increased and prolonged. It probably facilitates excitatory transmission in the cord and brain-stem.[4] Intoxication may manifest itself by both muscarine-like effects (miosis, bradycardia, salivation) and a nicotine-like effect (fasciculation of skeletal muscles). In animal experiments magnesium and calcium have afforded protection against the nicotine effect; small doses of physostigmine, administered before treatment, give added protection, but when they are administered after treatment the toxic symptoms are enhanced. Animal experiment indicates that D.F.P. is much less effective than prostigmin in antagonising curare.[5] Investigations have been extended to man, in whom it has been tried in myasthenia gravis, glaucoma, and postoperative paresis of the intestine. The effective ratio of intramuscular to oral dosage is about 1 to 4. The administration of 2–3 mg. intramuscularly decreases plasma and erythrocyte cholinesterase, and since the action is irreversible, even after a single dose the plasma esterase does not return to normal for several days or even weeks. Large repeated doses may produce gastro-intestinal symptoms—increased peristalsis, vomiting, diarrhœa—due to stimulation of the parasympathetic system. In myasthenia gravis D.F.P. has proved less effective than prostigmin; but COMROE and his associates [6] suggest that, with its prolonged action, it might be useful as a supplement to prostigmin, diminishing fatigue when the patient first awakes. GADDUM and WILSON [7] found that 0·1–10·0 mg. intramuscularly caused no immediate relief of weakness, ptosis, diplopia, or dysphagia; but there was some improvement in patients given 0·5–2·0 mg. daily for three months. Applied to normal eyes, D.F.P. has a pronounced and prolonged miotic effect, producing false myopia and a decrease in intraocular tension; there may be spasm of accommodation, visual blurring, and ciliary pain. It is about five times more potent and persistent than physostigmine; and it can overcome the effects of atropine and homatropine on pupil and ciliary muscle. In concentrations of 0·05 to 0·1%, which are non-irritant, it usually lowers the intraocular tension of glaucomatous eyes even where pilocarpine and physostigmine have failed.[8] It has no direct effect on the iris muscle. On the gut D.F.P. exerts a powerful stimulant action, with increase in the tone, rate, and amplitude of contractions; this can be abolished by atropine. In postoperative paralytic ileus it is said to be more effective than prostigmin or posterior-pituitary extract.[9] The drug appears to have a promising future both in therapeutics and for the light it may throw on the mechanism of neuromuscular transmission.

1. McCombie, H., Saunders, B. C. *Nature, Lond.* 1946, **157**, 287.
2. Adrian, E. D., Feldberg, W., Kilby, B. A. *Ibid*, 1946, **158**, 625.
3. Hawkins, R., Mendel, B. 17th International Physiological Congress, Oxford, 1947.
4. Chennells, M., Wright, S. *Nature, Lond.* 1947, **160**, 503.
5. Hunt, C. C. *J. Pharmacol.* 1947, **91**, 77.
6. Comroe, J. H., Todd, J., Gammon, G. D., Leopold, I. H., Koelle, G. B., Bodansky, O., Gilman, A. *Amer. J. med. Sci.* 1946, **212**, 641.
7. Gaddum, J. H., Wilson, A. *Nature, Lond.* 1947, **159**, 681.
8. Comroe, J. H., Leopold, I. H. *Arch. Ophthal., N.Y.* 1946, **36**, 1.
9. Quilliam, J. P., Quilliam, T. A. *Med. Pr.* 1947, **218**, 378.

Our Hospitals

THE shortage of nurses has perhaps obscured the fact that we are also short of hospital buildings; for between the two world wars Britain, unlike the United States and the Scandinavian countries, undertook no large programme of hospital construction. In last week's Chadwick lecture Dr. C. T. MAITLAND, a principal medical officer of the Ministry of Health, showed that these two shortages are closely related: no less than half of the recently approved hospital rebuilding plans have been concerned with the improvement or extension of nurses' homes.

MAITLAND suggested two means whereby the effects of these shortages may be lessened: (1) a full use of outpatient departments, and (2) careful classification, according to their needs, of patients admitted for treatment. The outpatient department, properly used, hastens investigation and spares hospital beds; and he pleaded particularly for the preservation from "the tragedy of hospitalisation" of children, who, whenever possible, should be treated at home. He commended the example of a hospital in Middlesex where each year 11,000 inpatients are received while

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40,000 new cases are seen in the outpatient department; in another hospital only 7% of medical outpatients and about 25% of surgical outpatients are found to require admission. In the staffing of outpatient departments MAITLAND believes that general physicians and general surgeons should be brought to the fore, though they should be able to call on special knowledge or techniques. Science, he reasons, must be matched with humanism, and humanism gets short shrift where there are many separate, highly specialist clinics. Again on humanistic grounds, he is emphatic about the maximum number of beds in the hospitals; in their design they should respect the unity of medicine by including a department in each of the major specialties; but lay, medical, and nursing personnel should not be asked to supervise a hospital with more than 500–750 beds, even though a larger number may be administered with equal ease. This is a welcome plea, particularly if it takes psychiatry within its compass. As for the special hospitals, he pointed out that in large centres such as London these were founded at a time when surgeons and physicians in new branches, in peril of being overborne by the main stream, withdrew to evolve their special techniques. The peril is now past; and, rightly contending that continued detachment is harmful, MAITLAND would bring them back into the community of the general hospital. He allows, however, there may be a case for the separation of maternity.

With an eye to economy in skill he proposes that those needing active treatment should be separated from others who require only maintenance. This precept is in fact followed in some hospitals caring for the aged sick, notably the West Middlesex; but his further proposal—that recovery wards should be run in association with wards for the acutely ill—is more novel. Such an arrangement would undoubtedly be economical; but implying, as it would, the transfer of patients from one ward to another, it cannot be said to promote the mental comfort of the patient that he seeks to foster. This consideration is perhaps less important with patients admitted for diagnosis if their stay is likely to be short. We are all familiar with the patient who, simply because a particular investigation demands his presence in hospital, takes up a bed which might otherwise be occupied by an acutely sick man or woman. To avoid this there is a strong case for setting up a special investigation ward in close geographical and administrative proximity to the outpatient department, where patients, until their discharge or admission to the hospital proper, would have dormitory accommodation, with food provided, on a help-yourself plan, in a nearby dayroom.

MAITLAND argues against vested interest in hospitals; despite their emotional appeal, "bigger and better" hospitals should not be the prime objective of the new service. Pride of place, he thinks, should go rather to the public-health branch. Meanwhile hospitals, handicapped by shortages, will pass on a heavy load to the local health authorities which are responsible for the patient after his discharge. Here he attaches great weight to a close nexus between the hospital management committee and the local health authority; and he casts the hospital almoner for the rôle of liaison officer. For the operation of the service as a whole he pointed to JOHN STUART MILL's dictum —"power at the periphery: wisdom at the centre."

Annotations

NEGOTIATION

As already explained, discussions between the medical profession and the Ministry of Health on the National Health Service Act have so far been conducted by subcommittees of the Negotiating Committee meeting officials of the Ministry. A meeting between the full Negotiating Committee and the Minister himself was arranged for Nov. 11 and 12; but this has now been postponed, at Mr. Bevan's request, until Dec. 2 and 3. The postponement will enable him to make a closer study of the document he received from the Negotiating Committee on Nov. 7, in which they present their observations on a number of disputed issues affecting general practice. Before members of the profession are asked to reach any decision about participation in the service, they will receive a larger document which will contain the committee's observations on all the subjects under discussion, and the Minister's replies to any criticism of his proposals.

PATIENTS AS SANATORIUM NURSES

EX-PATIENTS are now fairly often engaged as sanatorium nursing staff; and on another page Dr. Watt and Miss Sheehan describe a successful scheme of the kind at the King George V Sanatorium, Godalming. Elsewhere Dr. Kissen [1] has told of a less satisfactory experience at Bellefield Sanatorium, Lanark, where a process of continuous reablement of selected patients was attempted.

Five two-bed side-rooms of a ward (closed owing to lack of staff) were converted into three double bedrooms, a sitting-room, and a dressing-room, for six patient-nurses, each of whom was provided with a rest chair. Meals were taken in the main nurses' dining-room—Dr. Kissen does not say whether with the rest of the staff or separately. It was intended to transfer each batch of six patients to the nurses' home as each fresh group of six was recruited. At the start they were engaged for a 24-hour week with a 4-hour day, the duty periods being in the morning, afternoon, and evening of successive days; they were not asked to take night duty. Later it was found possible to increase the hours to 36 a week with a 6-hour day, sometimes broken by a long rest-period. The patients were paid at the rate of student nurses for the hours actually worked, and this very low rate of remuneration —for a 24-hour week they got 11*s.* 8*d.*—was one of the chief causes of failure; for most of the girls lived in Glasgow, a half-crown return journey away; and had they chosen to go home for convalescence instead of working they would have received the basic tuberculosis allowance of 25*s.* a week.

Nevertheless 11 girls took part in the scheme, including 2 from another sanatorium. Their lesions were inactive, and they were all free from symptoms and had been up all day and on graduated exercise for some time. Most of them spent a week or two at home before beginning work. They were warned thoroughly about the proper use of leisure, but only 4 seemed to take the warning to heart; most of them spent much time at entertainments in Lanark and Glasgow, and their long off-duty times—put to such improper use—roused the resentment of the permanent staff.

The patients were evidently not happy in the work, for Dr. Kissen reports many petty squabbles; and only 1 patient is still on the staff after some ten months' service. They were advised to stay a year, to enable the medical staff to assess their condition and working capacity, but 6 resigned after less than three months, 3 after less than four months, and 1 after five months. On the whole their physical health had improved, Dr. Kissen considers, despite a slight loss of weight after taking up work. The scheme was abandoned when the closed ward was reopened, and though there have since been requests by other patients to join the scheme, it can hardly have been said to have proved a success.

One or two reasons for the greater success at Godalming are immediately apparent. Only really fit staff are engaged, and they have to be able to do a full day's

1. Kissen, D. M. *Tubercle, Lond.* 1947, **28**, 185.

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work; they are not segregated from the rest of the nurses but share the same mess-rooms and sitting-rooms. Their leisure is more controlled: they may attend dances, but tennis is forbidden, and they must be in by 10.30 P.M. unless they have the medical superintendent's permission to stay out later. Moreover, they are a much-valued section of the staff. It must be recognised, however, that the aim in the two schemes was rather different: Dr. Kissen set out with the deliberate intention of reabling convalescent patients, whereas Dr. Watt employs only patients who are thoroughly fit. Dr. Kissen's experiment has been useful in drawing attention to the special difficulties encountered when a reablement scheme is attempted in a sanatorium mainly staffed by full-time healthy nurses.

CASTRATION AND ŒSTROGEN IN PROSTATIC CANCER

NO-ONE now doubts that in prostatic cancer temporary relief can be obtained from either castration or the administration of œstrogen. Yet the rationale of these procedures remains in part unknown. Either of them, though in different ways, will check the supply of androgen on which the development, maintenance, and activity of the normal prostate depend: œstrogens will reduce the supply of pituitary gonadotrophin and so inhibit the capacity of the testicles to supply androgen, whereas castration will cut off the supply of androgen directly. And any condition in which the concentration of androgen in the blood is greatly diminished will be accompanied by ischæmia and atrophy of the prostate gland and other accessory male genital organs. It seems reasonable to assume that the consequent shrinkage of these organs would at once lower the tension in the affected parts and so alleviate pain, and that the local ischæmia would retard the growth of a tumour. An inquiring man, however, will wonder whether such a simple explanation covers the whole problem. He may ask if a malignant growth in the prostate is ever, apart from the blood-supply, to some degree dependent on androgen for its vigour. Cancer cells are usually regarded as uncontrolled by the tissues of the host; but this may not be a universal rule. Malignancy varies in degree, and it is conceivable that some cancer cells are not so entirely undifferentiated as to be irresponsive to the normal hormones.

Some clinicians regard the giving of œstrogen to patients with prostatic cancer as a more potent remedy than castration, though castration is the readier way to stop the main supply of androgen. If this view is correct, œstrogen must exert some beneficial effect which removal of the testicles does not afford. Possibly œstrogen curtails the output of androgen by the adrenals as well as by the testicles, whereas castration would not have this effect. Meanwhile it has to be remembered that no general anticarcinogenic property has been demonstrated in œstrogen, the reactions to which are mainly confined to those tissues which it regulates in health—namely, the organs concerned with reproduction. Elsewhere in this issue Dr. Ludford and Dr. Dmochowski report that stilbœstrol had no specific inhibitory effect on growth of the mouse tumours used in their experiments.

Œstrogens, however, possess the capacity of increasing the connective-tissue stroma, with an excessive deposition of collagen, in many organs of the body, including the prostate. This reaction has been recorded by numerous observers and has been discussed with abundant histological detail by Mosinger[1] in a comprehensive monograph based on the results of giving large doses of œstrogen weekly to guineapigs. The practical importance of this reaction needs further experiment in connexion with the treatment of cancer; for it has been thought on reasonable grounds that the speed of neoplasia may occasionally be restricted by the local development of fibrous tissue—in fact, deposits of collagen have seemed to represent a definite, if ineffectual, curative attempt. Until this point has been quite elucidated, these considerations suggest that a combination of castration with the administration of œstrogen may be more beneficial in prostatic cancer than either remedy used alone.

1. Mosinger, M. Le Problème du Cancer, Paris, 1946.

MALARIA IN NORTHERN CLIMES

THE spread of malaria as an endemic disease is limited by temperature, the northern limit for benign tertian and for quartan malaria in Europe being the summer isotherm of 60°F, and that for malignant tertian 70°F.[1] Temperature also governs the development of the sexual form of the plasmodium in the mosquito. This development takes 10–14 days at a temperature of 77°F and 14–18 days at a somewhat lower temperature, and does not take place at all if the temperature is permanently below 59°F.[2] Moreover, in temperate climates malaria tends to have peaks in spring and autumn. Swellengrebel and De Buck[3] showed that, in the Netherlands, the spring peak was due to infection which had been acquired the previous autumn and had remained latent during the winter. An even longer incubation has been fully proved by Hernberg's account[2] of the outbreaks of tertian malaria in Finland, which lies north of the summer isotherm of 60°F—i.e., beyond the bounds of endemic malaria.

Finland had been almost entirely free from malaria for about twenty years when the infection was reintroduced there during the late war by Finns who had been fighting the Russians. By the end of the summer of 1941, 57 isolated cases had been reported; there were 583 cases in 1942, 262 in 1943, and 892 in 1944. These were nearly all in soldiers. The civilian cases numbered none in 1941, 75 in 1942, 53 in 1943, and 17 in 1944; and some of these patients were probably demobilised soldiers. After general demobilisation in 1945, however, there was a great spread of malaria among civilians, the total for 1945 being estimated as 1252 cases, excluding relapses. Hernberg investigated 856 of these cases. In spite of the high susceptibility of children to malaria there were no cases in children under 15 years of age, and there were not many in youngsters of 15–20. The seasonal incidence is illuminating. Between February and April, 1945, the mosquito-free period, there were 142 cases, and the peak of incidence was in May (440 cases) and June (352 cases), whereas in July and August, while mosquitoes were most abundant, the number of cases fell off rapidly. Hernberg says:

> "As 24–36 days must be assigned in Finland to full development of a complete picture of disease in transmission of infection from man to man via the mosquito, half the number of cases would have been infected already before the middle of April—i.e., before there were any mosquitoes at all—providing the infection had occurred in that year."

The seasonal incidence and the great preponderance of military cases show that most of the patients must have been infected the previous year while in military service elsewhere. Further, the geographical incidence in many cases was too disconnected for infection to have arisen where the malaria developed; and in some districts the summer temperature was too low to permit infection by mosquito bites that year. The view that infection came from hibernating mosquitoes is put out of court by the appearance of malaria in districts which had been free the year before. A questionary sent to 868 patients showed that all but 13 of the 596 who replied had been in military service the previous year in the

1. Christophers, S. R. British Encyclopædia of Medical Practice, London, 1938, vol. VIII, p. 304.
2. Hernberg, C. A. *Acta med. scand.* 1947, **127**, 342.
3. Swellengrebel, N. H., De Buck, A. Malaria in the Netherlands, London, 1938; see also *Lancet*, 1938, ii, 894.

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Karelian Isthmus, where there had then been much malaria.

The possibility of an epidemic of benign tertian malaria in England owing to the return of soldiers treated with mepacrine has already been discussed in these columns.[4] In the Finnish cases the incubation-period must have been 6–14 months, unless the cases were relapses. A long winter incubation in man is not likely to arise in cases of malaria developing in England, where the temperature lies well within the thermal boundaries of endemic malaria.

CARE OF THE AGED IN DENMARK

DENMARK was the first country to introduce the principle of free provision for the old. In his address to the International Conference of Physicians on Sept. 9 Dr. Johs. Frandsen noted that the Danish Old Age Relief Act of 1891 differentiated clearly between support in old age and help to the poor, though the extent of relief to the old was left to the discretion of local authorities. In 1922, however, the last flavour of poor-law was removed from the Act, and "old-age relief" became the old-age pension. It is paid to men over 65 and women over 60 whose income is below a prescribed level, provided they have a clean police record for the previous five years and have not lived lives offensive to public morals; presumably those who fail in these respects are relieved in other ways. The amount of the pension is a basic sum calculated on the cost of living in the capital, the provincial towns, and the country districts. Thus a married couple receive about £115 a year in Copenhagen, £98 in provincial towns, and £83 in country areas; this amounts to about 46% of the average net income of an unskilled worker. The sum varies with the cost of living, and there are various supplements—for example, a children's allowance for those who are responsible for children under the age of 17, fuel and clothing supplements, and a personal supplement for those with special difficulties. Of Denmark's 4 million inhabitants some 200,000 are at present drawing the pension.

As in England, there are both voluntary and municipal homes for the old. The council homes are exclusively for pensioners, the pensions being paid to the homes with the proviso that the old people are to live under conditions as good as they could buy with their pensions elsewhere. Entrance to the homes is voluntary, and the old people usually take their own furniture in with them; they can prepare meals in a common kitchen, and suitable interests and occupations are provided. Most of the voluntary homes were founded before legislation for the old was introduced.

Though small properly equipped flats are the most suitable homes for old people living alone, they are expensive to provide, and the Danish housing problem is as acute as our own. There are, however, some blocks of flats for old people, built by the local authorities before the war. A woman inspector lives in each block to help and look after the old people, and in many of the blocks there are assembly rooms for concerts and celebrations. In 1942 there was accommodation, in voluntary and municipal homes and in flats, for some 25,000 old-age pensioners throughout the country. In Copenhagen most of them are housed in flats; but it is estimated that 285 "places" per 1000 pensioners are needed in Copenhagen; while in other towns the figure is put at 250, and in rural areas at 200 per 1000.

Most of the homes have a sick-bay, and the largest of them has a hospital with a full-time medical officer. In other homes the old people can choose their own doctor, but if they have no preference they are attended by one appointed by the local authority.

4. *Lancet*, 1945, ii, 49.

"THEY ORDER THIS MATTER BETTER IN FRANCE"

THE tendency in France to elevate therapeutics into an art in its own right has led at times to a finical refinement ill suited to crowded evening surgeries. Perhaps we in this country have erred in a contrary sense in guiding our treatment by its apparent effect on the patient, without much theoretical consideration of the modus operandi of the remedy. In the case of penicillin the charge of pragmatism will not lie against us; but it is interesting to note the methods of our French colleagues in handling a drug of which our experience is somewhat longer than theirs.

A paper by Mollaret [1] on guiding principles in the use of antibiotics makes three major suggestions. The first is that, so far from decreasing as treatment proceeds, the dose should be maintained at its original high level; by this means he hopes to discourage the organism from becoming penicillin-resistant. (We doubt if, in this country, penicillin dosage is often arranged on a decreasing scale, since it is recognised by most users that a drug so rapidly excreted can be kept at optimum levels only by continuous or repeated dosage—in contrast to sulphonamide therapy, for example, where a large initial dose allows a high concentration to be built up which may be maintained by subsequent smaller doses.) His second suggestion is that the final dose should be double that administered previously, so that it shall give the coup-de-grâce to any organism that still resists. Since the concentration in the tissues is usually in excess of that required to deal with the organisms, the advantage of this procedure is questionable; but certainly nothing is lost by it beyond a few hundred thousand units of penicillin. Thirdly, and most ingeniously, he suggests that by giving penicillinase after the last dose of penicillin it may be possible to avoid creating a residue of drug-fast organisms at the end of treatment. This, however, seems to be a case of pursuing logic altogether too far. That strains of organisms exposed in vitro for many generations to sublethal concentrations of penicillin may become resistant to penicillin nobody doubts; but that this resistance will develop in the few hours while the last remnants of a therapeutic dose are being excreted from the body seems most unlikely. In fact resistance to penicillin seems to develop only rarely under therapeutic conditions, and may best be avoided by attention to Mollaret's first suggestion.

Though the last words on the administration of penicillin have yet to be said, we do not yet see reason to echo here the dictum of the Rev. L. Sterne.

DEATH ON THE ROAD

METHODS of reducing road accidents still need much study. Mr. J. S. Dean, in a recent book,[2] makes some interesting and meritorious suggestions for reducing these accidents. The installation of governors on vehicles subjected to a general speed-limit would doubtless be beneficial, though the manufacture of any mechanical device presents difficulties at the present moment. Footpaths beside all roads are also desirable, but the arrears of road maintenance which piled up during the war years will use up most of the money available for the improvement of highways for a considerable time to come. Mr. Dean notes that in 1937 private cars were involved in 33·2% of the total road accidents, public conveyances in 6·8%, and commercial vehicles in 14·3%; and he concludes that private cars have the worst accident record. This hardly tallies, however, with the car-mileages he gives for these different types of vehicles, which have the ratios of 14·40 : 3·04 : 7·18. Private

1. Mollaret, P. *Bull. Soc. méd. Hôp. Paris*, 1947, **63**, 643.
2. Murder Most Foul. A study of the road deaths problem. London: Published for the Public Affairs News Service by George Allen & Unwin. 1947. Pp. 114. 3*s*. 6*d*.

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cars seem in fact to have just about their share of road accidents having regard to the car-miles driven. There are, of course, more of them than of other types of vehicle on the road.

Mr. Dean is an advocate of prosecution rather than persuasion of the offender, and there can be little doubt that the enforcement of discipline among all users of the road would reduce road accidents. It is understandable that the motoring associations and the motor industry, which depend for their existence on the good will of the motorist, should advocate persuasion rather than legislation; but it is perhaps less easy to understand why the Royal Society for the Prevention of Accidents should support a similar policy. When, however, he advocates immediate institution of strong disciplinary measures against the erring driver, yet not against pedestrians who are at fault, Mr. Dean's attitude can hardly be called unbiased; the fact that he is the chairman of the committee of the Pedestrians' Association may have influenced him to some extent. It is noteworthy that the Committee on Road Safety appointed by the Ministry of Transport in 1943 recommend in their final report [3] that the pedestrian should be treated as traffic, and therefore liable to prosecution on failure to obey traffic-signals—an amendment to the existing law which is long overdue.

In discussing the report at the annual conference of the Royal Society for the Prevention of Accidents, Mr. G. R. Strauss, recently parliamentary secretary to the Ministry, pointed out that there was a drop in the number of accidents in the second quarter of 1947 compared with the same quarter of 1939—a drop from 1560 killed and 58,722 injured in 1939 to 1174 killed and 43,154 injured in 1947. The number of vehicles licensed in the 1947 period was slightly higher. Commenting on this, the Pedestrians' Association [4] note that the improvement chiefly relates to adult users of the road. Child-pedestrian deaths fell less than 5% between 1937 and 1946, while adult deaths fell by nearly a quarter. There has been some improvement among school-children, who can be taught road drill, but 347 children under the age of five were killed in 1946, compared with 329 in 1937; and three has now become the most dangerous age for children instead of five or seven.

POTATOES

DURING the war the housewife's main preoccupation in the kitchen was with masking the monotony of the food she laid before her family. In the last two years her problem has changed: the release of shipping and the resumption of trade with other countries has brought back fish, fruit, and other foodstuffs which had not been seen for six or seven years; but at the same time, mainly through the rationing first of bread and now of potatoes, the diet has tended to shrink in quantity. The housewife's concern is not so much that her dishes will not be palatable as that they may prove insufficient.

The Minister of Food, faced with the worst potato crop since 1931, has explained that with free purchase potatoes would disappear from the shops next spring. Accordingly he is restricting the normal consumer to 3 lb. a week and the expectant mother to 4 1/2 lb. a week. To offset this he is allowing one extra bread unit a week to children aged between five and eighteen years, and it is possible that for some of these the net result will actually be a gain in calories. For example, in one boarding-school, where the average age of boys is fourteen years, the 3-lb. ration will mean a reduction of only about 1 1/3 lb. (about 527 calories) on the former free consumption of 4 1/3 lb. Used for flour (5·3 oz.) the B.U. is capable of yielding 554 calories, and used for bread (7 oz.) it will yield 454 calories. For many adults however, and notably for heavy workers, the uncompensated restriction means a loss of both calories and bulk; and for all it means a loss of vitamin C, of which potatoes are a principal source.

Those who have the money can turn to other vegetables, and will thus be sure of getting enough vitamin C. Those who are poorer may be less fortunate. The price of these other vegetables, except that of carrots and cooked beetroot, is uncontrolled; and the cost, already high, may be expected now to rise still further, which implies rationing by the purse. Apart from the feasibility of more controls, a question that needs immediate attention is whether the time has now come for the general issue of ascorbic-acid tablets, as was practised in the Forces during the war.

3. Published Oct. 6. H.M. Stationery Office. 2s. 6d.
4. Quarterly News Letter, no. 58. October, 1947.

A HAPPY BIRTHDAY

SOME fifty of his grateful colleagues entertained Robert Arthur Young to dinner on his birthday on Nov. 6. Dr. C. E. Lakin, who presided, described Sir Robert as one of the greatest of living physicians, "but best of all a great friend." His teaching career at Middlesex Hospital began as demonstrator in physiology and continued as pathologist. Finally, in the late war, he had returned to astonish students by showing them how the interior of the chest could be displayed by what they regarded as the old-fashioned methods of inspection, palpation, percussion, and auscultation. In his years at Middlesex and at the Brompton he had trained many great physicians and even surgeons; and all whom he had taught wanted to express their thanks and good wishes. Mr. Victor Bonney spoke of early days in which Young, already a godsend to students, inculcated the method of learning—applying that logical sequence of ideas which is more serviceable than the parrot memory. Through all the following years he had gone from strength to strength, earning the respect of everyone that had to deal with him. If honours came late, this did not matter; "because in the hearts of all of us he has been top dog." In his reply Sir Robert admitted to difficulties during his time as warden of the medical college: indeed they had led him to join the Eccentrics Club so that a part of his existence might be on normal lines. (Perhaps this was also the reason for his association with THE LANCET, as our principal medical adviser for many years, beginning, as he said, when he "used to vet papers of doubtful medical veracity, and correct proofs," under the editorship of Thomas Wakley, jun.) At Middlesex, since the day 58 years and 1 month ago when he entered the school (younger than is now allowed), he had seen such men as Lowne, Powell, Kingston Fowler, Cayley, Coupland, Pringle, Bland-Sutton, and Andrew Clark; and as a student in Vienna he had met Ghon. He had started his professional career with two ideas—to be on the staff of the Brompton and on the staff of Middlesex—and he was deeply thrilled, touched, and gratified to be entertained on this occasion by a company containing so many representatives of these two hospitals, which he held in equal affection.

THE CHRISTMAS GIFTS

THOUGH many generous contributions have been received, the Royal Medical Benevolent Fund is still far short of the sum needed to ensure that all its regular beneficiaries are remembered this Christmas. Sir Alfred Webb-Johnson, as president, appeals for further donations to be sent as soon as possible to the R.M.B.F. (Christmas Gifts), 1, Balliol House, Manor Fields, London, S.W.15.

Mr. W. ROWLEY BRISTOW, consulting orthopædic surgeon to St. Thomas's Hospital and honorary consulting orthopædic surgeon to the Army, died in London on Nov. 10 at the age of 64.

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Special Articles

EMPLOYMENT OF TUBERCULOUS STAFF IN A SANATORIUM *

JAMES WATT
M.D. Aberd., D.P.H.
MEDICAL SUPERINTENDENT

MILLICENT SHEEHAN
S.R.N.
MATRON

KING GEORGE V SANATORIUM, GODALMING, SURREY

A SCHEME was started at the King George V Sanatorium in 1928 to employ as nurses and domestics tuberculous women who had satisfactorily completed sanatorium treatment elsewhere and needed a period of rehabilitation in healthy employment under skilled medical supervision. Difficulties experienced in engaging and keeping tuberculous domestics led after four years to the scheme's being limited to nurses. During the war tuberculous medical and male domestic staff were also engaged.

It was primarily a welfare scheme for the transition from sanatorium treatment to normal employment, the period when relapse is most likely to occur. This period of rehabilitation was normally limited to six months to benefit as many women as possible. Three women were to be engaged for every two posts and, in compensation to their employers, their pay for the first 3–6 months was half the normal rate for the post but with full emoluments. As competition developed with other sanatoria for these women, and as the shortage of recruits to the nursing profession increased, the scheme changed; after 1937 full pay was given from the time of joining, and the idea of three women for two jobs was dropped. Still later, as a result of the work of the Rushcliffe Committee, these women were granted very much the same rights to pay during sickness and admission to the superannuation scheme as healthy members of staff, though still classed as temporary staff. Admission to the superannuation scheme imposes ittle extra liability on employers, because in case of breakdown in health pension cannot be claimed for less than ten years' service, by which time the risk of relapse becomes very small.

STANDARD OF HEALTH

The standard of medical fitness required of candidates was high. Their lung disease had to be quiescent and tubercle bacilli absent for several months from any sputum they might still have. If tubercle bacilli reappeared in their sputum, they were (except 5 persons in whom tubercle bacilli were found once without other evidence of activity) sent back to a sanatorium for further treatment and written off the books. This policy was deemed necessary for the protection of healthy members of the staff, who were aware of it and reassured by it. The healthy and the tuberculous members of staff shared the same messrooms and sitting-rooms. We have had no evidence of the transmission of infection by this association, and it has only been on two or three occasions that healthy staff or their parents have shown any dread of infection.

Candidates had to be fit for a full day's work. Part-time workers require much more bed-room and other accommodation and supervision by senior staff than are here available. Though these standards of fitness were required in most of the cases, a few women who, though they had no tubercle bacilli in their sputum, did not conform to them were accepted either on compassionate grounds or because they had broken down in other hospitals of the same local authority. A risk to be guarded against is that the sanatorium may be regarded as a dumping ground for "crocks" from other hospitals. For that reason the sanatorium officers must have the right to accept or reject sub-standard candidates. As the years have passed, an increasing proportion of those joining under the scheme are trained or partly trained nurses who have broken down with tuberculosis in general hospitals to which it is inadvisable they should return. It is further very important that candidates should be seen personally before acceptance, both by the medical superintendent in regard to medical condition and by the matron for suitability on other grounds. Without this there are sure to be disappointments either for the candidate or for her employers.

CONDITIONS OF WORK

The care of the tuberculous staff here is the responsibility of the medical superintendent, who examines them every month with the matron present. A few who are very fit are examined only every second or third month. They are weighed monthly and have chest radiograms taken every 3–6 months according to the stability of their chest lesions. Sputum, if they should have any, is examined every month or immediately they report having sputum. Radioscopy of artificial-pneumothorax (A.P.) cases is done both by the experienced medical officer giving the refills and monthly by the medical superintendent. Except in the case of the very fat, the tuberculous staff receive each a total of $8^1/_2$ pints of milk a week. They are not allowed to play tennis, but may take part in dances and may stay out after 10.30 P.M. only with the permission of the medical superintendent.

The precautions taken to guard healthy staff from both their tuberculous colleagues and the patients include the wearing of overalls and masks in the handling of soiled linen but not at other times, such as during bed-making; insistence on careful washing of hands before going to meals; on gentleness in stripping beds and moving pillows; on no meals being taken in the wards; on routine disinfection by boiling of all crockery and cutlery used both by patients and staff; and on the usual damp dusting and sweeping. Special emphasis is laid on the risks of borrowing patients' books, accepting sweets or fruit from patients, moistening finger or pencil in the mouth, and allowing patients to talk over a nurse seated at a lower level. They are drilled in careful handling of sputum mugs and flasks, handkerchiefs and pockets, and infected dressings.

The tuberculous staff, having been drilled in all precautions during their own treatment, appreciate all the special points better than do the healthy staff. Their service therefore is in general more intelligent and more sympathetic, and they have a wider understanding of the psychology of the tuberculous patient. The type of nurse who appears to contract tuberculosis is so often the highly conscientious nurse who never spares herself in the interests of her patients.

Here perhaps it is appropriate to pay tribute to the work performed by these staff. We are fully aware of the debt of gratitude that we—and perhaps to a far greater extent the patients of this sanatorium—owe to them. We can with sincerity say we have never had to spur them on to play their part but rather to curb their energies. They have been of all grades up to the rank of assistant matron. All took their share of fire-watching and other activities special to war-time. Many of the student nurses have gone forward for general training with great success and early promotion. Quite a few have served with distinction and maintenance of health in the Services at home and abroad. Many of the post-graduate nurses have reached high rank in the nursing profession—three during the past two years having been appointed matrons of large hospitals.

Apart from any systematic scheme of employment, tuberculous persons tend to drift into sanatorium jobs, sometimes without disclosing a past history of

* Paper read to the Tuberculosis Association, April 19, 1947.

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treatment, sometimes in ignorance that they have had any chest disease. During the 25 years since the sanatorium was opened, about 2200 persons have been taken on the staff. Of these, 4 were discovered who had concealed a previous history of tuberculosis, and 14 were discovered, mostly by radiography on joining, with pre-existing tuberculosis of which they had been ignorant. Of these 18 so screened out, 9 were sent away for sanatorium or hospital treatment and 2 for observation without treatment. Others with previous tuberculosis may have been missed, especially before 1929, the year when it became the rule for all staff joining to have their chests radiographed.

RESULTS

Since 1928, when the policy was adopted of employing tuberculous staff, 203 more have been engaged up to March 8, 1947, and the fate of these persons is the main subject of this report. They are dealt with separately, as they were deliberately accepted as suitable cases for employment, though sometimes, as already indicated, under pressure of compassion or expediency.

Their average duration of service was 20·3 months, which gives an aggregate of 343 person-years. Their average age on joining was 25·5 years, and 28 of them were under 21 years of age. Their rank was as follows:

Student nurses	62
Staff nurses	51
Assistant nurses	36
Sisters	15
Domestic assistants	12
Porters	12
Medical officers	10
Others	5

They were classified medically as follows:

Respiratory tuberculosis:

A	77, of which 8 were pleural only.
B1	29
B2	88
Not classified	5

Other forms of tuberculosis:

Peritonitis	1
Chondritis	1
Adenitis	2

The medical quality of the material dealt with may also be judged from the forms of treatment they had had:

Artificial pneumothorax	84 cases, of which 9 had been terminated before they joined (2 were bilateral)
Phrenic evulsion	18
,, crush	9
Thoracoplasty	5
Extrapleural A.P.	3
Oleothorax	4
Plombage	1

Weight:

83 gained an average of 6 lb.
86 lost an average of 6¼ lb.
34 no change or not recorded.

Condition on leaving:

Quiescent	157
Much improved	2
Improved	2
Stationary	12
Worse	30

Fitness for work on leaving:

Full work	156
Light work	7
Unfit	40

Relapses.—Of the 203 persons 8 had minor relapses, chiefly pleural effusion in A.P. cases, ending in recovery and resumption of work. In 30 there were major relapses which led to their discharge from the service; 28 of these were returned to sanatoria or hospital for further treatment. Tubercle bacilli returned to the sputum in 21 of these cases.

Exactly half of the relapses occurred in the 12 years 1928–39, and the other half in the 7¼ war and post-war years from 1940 to March, 1947. The number at risk during the first period was 94, and during the second, the shorter, period was 109. The strain on all grades of staff, even apart from conditions directly caused by the war, has been greater during the second period owing to increasing shortage of staff, rationing of food, and the more intensive character of treatment given to patients.

Deaths.—No complete follow-up has been possible, but of the 203 persons 10 are believed to have died of tuberculosis, 1 of abdominal cancer, and 1 of acute pancreatitis. Of the group of 18, 2 are known to be dead.

CONCLUSIONS

Taking into account the medical quality of the cases dealt with and what might be called the normal expectation of relapse, especially during the first year after completing sanatorium treatment, we judge that 30 relapses among 203 tuberculous persons in an average period of observation of over 20 months is considerably less than would have occurred had these ex-patients gone to their homes or their ordinary employment. We have no means of testing this by a control, but tuberculosis officers working in a busy dispensary are in a better position to pass judgment. Alternatively, other sanatoria with similar employment schemes may be able to test their results against those described today.

NEW CASES OF TUBERCULOSIS AMONG STAFF

A matter of very great importance but not strictly relevant to the main part of this investigation is the question of the incidence of tuberculosis among sanatorium staff hitherto free from that disease. Since this sanatorium opened in June, 1922, records have been kept of all sickness among staff; and, though it did not become routine procedure to radiograph the chests of all joining till 1929, we think it unlikely that any cases were missed while they remained here. Excluding medical, clerical, and male domestic staffs, none of whom developed tuberculosis, and for whom exact figures are not at present available, 2009 persons joined the staff, staying various periods. This number includes 510 student nurses seconded here for an average period of three months. The total period of exposure to risk was 2118 person-years or the equivalent of about 85 persons on the average at any one time. In this period of nearly 25 years, 14 members of staff have developed tuberculosis:

4 had a primary infection, all with a good prognosis.
4 had erythema nodosum alone.
3 had a pleurisy alone.
3 had frank pulmonary tuberculosis.

These 14 cases represent an incidence of less than 0·7% per annum of those at risk. If we remember that the great majority of staff joining belong to the age-groups in which tuberculosis has the highest incidence, we claim that this result is extremely satisfactory; and, if other sanatoria up and down the country can publish equally good figures, the fear of sanatorium nursing which is so often expressed should be completely dispelled.

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NATIONAL INSURANCE AND THE SELF-EMPLOYED

MINISTER'S SPEECH

DOCTORS will be interested in last week's speech by Mr. JAMES GRIFFITHS, Minister of National Insurance, in which he explained the self-employed man's rights and responsibilities under the new National Insurance scheme. The scheme, which is to come into force next July, is, he said, to be universal; but the conditions have been varied to suit the different ways of life. There will be three classes: class 1 comprises those employed under a contract of service, no matter how high their salaries; class 2, those gainfully occupied on their own account, including those who, while not employed under a contract of service, are employed under a contract for services; and class 3, those who are not gainfully occupied. For the three classes there are different contributions and benefits.

OBLIGATIONS UNDER THE ACT

Self-employed people who are not already insured under either the health, pensions, or unemployment schemes will have to register early next year. They will complete a form of application which will be available at post offices, employment exchanges, and local offices of the Ministry of National Insurance. They will receive a contribution card which, when the scheme starts in July, they will have to stamp each week. The weekly class 2 contributions are 6*s*. 2*d*. for a man and 5*s*. 1*d*. for a woman; but the Minister has powers to exempt from payment those whose income does not exceed £104 a year.

BENEFITS

In return for his contributions the self-employed man gets sickness benefit, maternity benefit for his wife, benefit for his widow if he dies, guardian's allowance for his children if both parents die, retirement pension in his old age, and death grant to help with funeral expenses.

Sickness Benefit.—The Act provides that the self-employed man shall get this benefit on the same terms as an employee. The weekly rate is 26*s*. for himself, 16*s*. for his wife, and 7*s*. 6*d*. for his first child. A single woman gets 26*s*. a week, and for a married woman who is herself insured the rate is 16*s*. If the insured person has contributed for three years or more the benefit continues, however long the illness, until replaced by retirement pension; if contributions have been paid for only six months the benefit lasts for a year.

Maternity Benefit.—This is of two kinds: a lump sum of £4 and a weekly payment of £1 for four weeks. A woman who is in gainful employment will be entitled to a special allowance of 36*s*. a week for thirteen weeks.

Retirement Pensions.—Pension age in the scheme is 65 for a man and 60 for a woman; and the basic rate is 26*s*. a week for men and 16*s*. for women. The pension will not be paid at 65 to a man who continues at his ordinary work; but when eventually he retires he will receive pension for himself and his wife. Special provision has been made for wives who are doing paid work outside their own home duties. There is no means test; but if a man, after retiring, takes up other work his retirement pension will be reduced by 1*s*. for every 1*s*. he earns over 20*s*. a week.

If, on reaching pension age, a man carries on with his ordinary work, his pension when he does retire will be at a higher rate: the amount is to be increased by 1*s*. a week for every twenty-five contributions paid after pension age. His wife's pension, paid on his insurance, is increased in the same way for every twenty-five contributions he makes while both are over pension age. If he is still in business at 70, then the retirement pension, with the increase, is paid without any restriction. After age 70 for men and 65 for women there are no retirement conditions for payment of pension, and there is no reduction on account of earnings.

The husband's pension insurance provides a pension for his wife as well as for himself; the basic rate for her is 16*s*. While she is under 60 this 16*s*. is paid as part of the husband's pension. After she reaches the age of 60 the pension is paid independently to her, unless she is gainfully occupied and has not retired from her regular employment.

If a man is over 65 or a woman over 60 years of age at the beginning of the scheme, he or she will not be in the scheme at all. A man over 55 or a woman over 50 will have to contribute for ten years before they are eligible for retirement pension; and if they do not wish to qualify for pension they may, on reaching pension age, decide to receive a refund of the retirement pension part of their contributions. Those who enter the scheme at earlier ages will have no reduction in pension.

Widows.—For each of the first thirteen weeks of widowhood 36*s*. is to be paid. Further pension depends on circumstances. With a child under school-leaving age, a widow will receive an allowance amounting to 33*s*. 6*d*. a week; but this sum is reduced by 1*s*. for every 1*s*. by which earnings exceed 30*s*. If she is not entitled to this benefit but is over 50 years of age when widowed and has been married at least ten years, she will get a pension of 26*s*. a week, similarly reduced if she is earning. At 60 these benefits are replaced by retirement pension. New entrants must contribute for three years before their widows will be entitled to these benefits.

Guardians' Allowance.—This allowance amounts to 12*s*. a week for each child where both parents have died; it is paid so long as one parent was insured.

Death Grant.—The amount is £20 if the deceased person was over the age of 18, with smaller amounts for younger people. It will not be paid for anyone who dies during the first year of the scheme, or for anyone who was over pension age when the scheme started, or for a child born before the start of the scheme who dies under the age of 10. For men over 55 or women over 50 at the beginning of the scheme the amount will be £10.

Regulations for the operation of the Act, said Mr. Griffiths, are being formulated by his Ministry with the help of the new National Insurance Advisory Committee.

HOSPITAL RECORDS

COURSE AT OXFORD

A COURSE-CONFERENCE * for hospital records officers held at Oxford in September provided, so far as is known, the first opportunity for those in Great Britain interested in hospital medical records to meet and exchange information. The meetings were attended by 100 people.

Miss ELSIE ROYLE, of the Christie Hospital, Manchester, dealing with the duties and responsibilities of records officers, said:

> "The qualifications of a records officer include all the virtues of tact and diplomacy, initiative and energy, good humour and patience, a progressive outlook, and the ability to organise and to teach. To these personal attributes, a knowledge of medical terminology, anatomy, and physiology, and an appreciation of statistical theory should be added, and last—and probably most important—experience in hospital and medical ethics."

Miss Royle's theme was that the medical profession needs trained help in the analysis and presentation of the results of its hospital work, and that if hospitals are to have good medical records and to use them intelligently someone must organise their preparation and analysis. This organisation is a task for which clinicians have insufficient time; and all the work connected with records should be concentrated in the hands of a trained officer.

Mr. H. COTTON, of the Nuffield Bureau of Health and Sickness Records, Oxford, described the purposes and uses of medical records in hospitals. He observed:

> "The main need today is for a broadly uniform system of medical record-keeping in British hospitals. If record-keeping is indeed a scientific task, the laws of the science should be discovered and generally applied. A uniform system would not mean regimentation. It would mean that certain well-defined principles would be followed by all hospitals, with adjustments best suited to individual requirements. It follows that if medical record-keeping

* A digest of the proceedings, price 2*s*. 6*d*., may be had from Mr. H. Cotton, 10, Parks Road, Oxford.

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is to have a broad plan, and if the best techniques are to be adopted by all concerned, there is a need for persons versed in the plan and skilled in the techniques. This means that the production and care of medical records should not be allotted haphazard to persons with no special aptitude, training, or experience. Trained medical records officers are essential members of modern hospital staffs."

Prof. J. A. RYLE indicated how the absence of records, or the inability to use them, can be a very real handicap to a clinician, whether a junior or senior member of the hospital staff, a consultant, or one holding a public appointment. He emphasised the advantage of team-work, adding that today the almoner and the records officer are just as much a part of the medical team as the pathologist, the physiotherapist, and others. Follow-up, he said, should not be limited to a few special diseases; and any follow-up scheme depends for success on accurate and readily accessible records.

Dr. P. L. MCKINLAY, medical statistician to the Department of Health for Scotland, speaking on records as potential data for statistics, pointed out that hospital records will provide information only on intercurrent morbidity, and even in this respect their capacity must not be over-estimated. For instance, one result of modern drug therapy is that many diseases formerly treated in hospital are now being treated at home; moreover, hospitals select their cases to some extent. The sickness of the community as a whole, therefore, is not reflected in hospital figures. Other elements which have to be studied in assessing public health are predisposing factors, prognosis, and criteria of response to therapy. Hospital records can contribute some information regarding the first and second questions. Prognosis is more easily determined, from the community point of view, from data contributed by general practitioners.

The hospital administrator's view was put by Mr. STEPHEN C. MERIVALE, house governor of the Bristol Royal Hospital, who said that the position of the records officer is clearly that of a departmental head, responsible to a records committee consisting almost wholly of medical staff for all matters affecting records generally, and to the house governor for administrative matters affecting the hospital as a whole. The records officer should be responsible for the appointments system, the registration of all patients, the journeys of notes throughout the hospital, the allocation of typists and stenographers engaged on typing clinical notes and letters to outside practitioners, and the more generally recognised duties of filing, indexing, and analysing medical records. Where there is a medical library, it should be under the records officer. If the best use is to be made of a hospital's beds, a central waiting-list should be compiled by the records officer, who under the direction of the various clinicians would initiate the admission of patients to hospital.

The subjects dealt with in a syllabus covering eight days included medical nomenclatures and classifications, unit records, diagnostic indices, appointments systems for patients, medical terminology, microfilming, and medical and surgical dictation.

The following expressions of opinion by those attending the course-conference appeared to command general assent:

1. In all hospitals adequate documentation of medical service should be the rule.

2. In the larger hospitals at least, responsibility for the production and care of medical records should be assigned to a person (not necessarily medically qualified) skilled in this work.

3. The person to whom this work is assigned should be designated "medical records officer" and should have the status of a departmental head.

4. The medical records officer should be qualified by training and practical experience for the work undertaken; the subjects studied should include anatomy, physiology, medical terminology, organisation techniques, filing and indexing methods, photographic and microfilming methods, coding and classification, interdepartmental relations, interview technique, simple statistical methods, and, in some cases, punched-card methods.

5. There is a need for training facilities. One way of meeting this need initially would be by the establishment of training schools for medical records officers in one London hospital and one provincial hospital; the hospitals chosen should be first equipped with a records department of the most efficient and up-to-date kind.

6. A basically uniform system of medical record-keeping should be devised, not to prescribe pro formas for hospital doctors but to standardise methods of registration and techniques for the preparation, storage, and indexing of medical records.

REGIONAL OFFICERS

THE following is a complete list of the senior administrative medical officers who have been appointed to the regional hospital boards:

North-east Metropolitan.—Dr. J. I. P. WILSON, superintendent, Hackney Hospital, and a former E.M.S. sector hospital officer.

North-west Metropolitan.—Dr. H. M. C. MACAULAY, M.O.H. for Middlesex.

South-east Metropolitan.—Brigadier H. L. GLYN HUGHES, commandant of the R.A.M.C. depot, and inspector of training, Home Command.

South-west Metropolitan.—Dr. W. J. GILL, superintendent, Paddington Hospital, director, E.M.S.

Birmingham.—Dr. S. J. SCURLOCK, superintendent, Queen Mary's (Roehampton) Hospital, Ministry of Pensions.

East Anglian.—Dr. J. B. EWEN, principal assistant medical officer, hospitals section, Middlesex County Council.

Leeds.—Dr. A. B. WILLIAMSON, M.O.H., Portsmouth.

Liverpool.—Dr. T. LLOYD HUGHES, M.O.H., Middlesbrough.

Manchester.—Dr. F. N. MARSHALL, a senior medical officer, Ministry of Health.

Newcastle.—Dr. W. G. PATTERSON, M.O.H., Surrey.

Oxford.—Dr. G. C. WILLIAMS, M.O.H., Oxford.

Sheffield.—Dr. W. A. RAMSAY, superintendent, Crumpsall Hospital, Manchester.

South-western.—Dr. G. C. KELLY, a senior medical officer of the Ministry of Health.

Wales.—Dr. A. T. JONES, medical officer, Welsh Board of Health.

Parliament

QUESTION TIME

Cholera Vaccine for Egypt

Dr. S. SEGAL asked the Secretary of State for Foreign Affairs how many thousands of doses of cholera vaccine had been sent from this country to Egypt; and how had they been distributed.—Mr. E. BEVIN replied: Quantities sent represent about 1,400,000 doses. Of this total I am informed that 155,000 c.cm. were supplied from stock at the time of the outbreak and were manufactured in or after June, 1946. The balance was manufactured in September and October of this year. As regards distribution, 25,000 c.cm. have been supplied by the War Office to the Egyptian Air Force, 220,000 c.cm. to General Headquarters, Middle East, and to the British Embassy in Cairo for inoculating members of the British Forces and British civilians. The balance of over 1,800,000 c.cm. was supplied by British firms to the order of the Egyptian Government. Dr. SEGAL: While I thank the Minister for the detailed reply, which I hope will do a great deal to remove some misconception in Egypt, may I ask if it would not be a humane action on the part of this country if a team of expert epidemiologists could be sent out to Egypt to assist that country in coping with this dreadful plague? Mr. BEVIN: I must say that with all the difficulties going on in the world I am extremely short of this type of person, but I will look into it.

Three in One

Dr. SEGAL asked the Minister of Defence when he would undertake to institute a unified medical organisation for the three defence Services, in order to economise in man-power and medical supplies.—Mr. A. V. ALEXANDER replied: As I explained on July 9, it has not yet been established that the institution of a unified medical service is to be preferred

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to the maximum degree of coördination between the existing services. Dr. SEGAL: Has the mind of the Minister really not been able to travel any further distance on this matter since July 9? Mr. ALEXANDER: I said that the matter was under examination, but if one is talking about either coördination or integration, one must first be satisfied that it is going to improve efficiency or reduce costs.

Sir HENRY MORRIS-JONES: Is not the Minister aware that medical officers of both the R.A.F. and the Army are writing to the medical journals week by week to say that they have virtually nothing to do, and, in those circumstances, would he take steps to economise in man-power with regard to such men? Mr. ALEXANDER: I must say that I have seen one or two comments of that kind, but they do not agree with the advice given by their senior professional advisers. Dr. SEGAL: Would the Minister take steps to get some coördination of the specialist services of the three defence Forces? Mr. ALEXANDER: Certainly; that is already being done.

Specialists in the Services

Colonel M. STODDART-SCOTT asked the Minister of Health (1) whether, in view of H.M. Government's decision to reduce the size of the Services, he would reduce the age-limit of medical and graded specialists, who were now liable to be conscripted up to the age of 40, in view of the shortage of specialists in civil life, and (2) if, in view of the large reduction in the size of the three Services, he would accelerate the release of doctors and dentists now serving with the Forces; and if he would assure the House that there was a proportionate reduction in the number of those who were now conscripted in view of the shortage of doctors and dentists in civilian practice.—Mr. JOHN EDWARDS replied: The Minister is advised on the recruitment and release of doctors by the Medical Priority Committee under the chairmanship of Dr. Haden Guest. I am awaiting their advice on the effect of the recently announced reductions in the size of the Forces. As regards dentists the position is to be examined by my department with representatives of the Services and the dental profession later this week.

Venereal Diseases in the Services

Replying to a question, Mr. E. SHINWELL gave the following rates per 1000 strength for the incidence of venereal disease among British troops during the first two quarters of 1947:

—	1st quarter	2nd quarter
United Kingdom	5·2	5·6
Germany	36·4	34·8
Italy	23·7	34·1
Austria	36·8	34·7
Middle East *	6·7	4·7
Far East	32·6	27·7
Japan †	61·2	46·8

* As a result of administrative changes, Middle East includes Malta and East Africa as from April 1, 1947. The sharp fall in the 2nd quarter is at least partly attributable to a reduction in the number of troops in Greece, where the rate of venereal disease was high.

† The number of troops in Japan is small and sharp fluctuations are therefore to be expected.

Our Calories

Mr. H. R. SPENCE asked the Minister of Food what was the calorie intake per head shown by his most recent dietary survey; and what was the figure for the nearest corresponding date last year.—Dr. E. SUMMERSKILL replied: The most recent survey results are for July, 1947, which show an average intake of 2287 calories for working-class households from food eaten at home. The figure for July, 1946, was 2282 calories.

Replying to a question, Dr. SUMMERSKILL stated that the estimated national average calorie intake from all foods, rationed and unrationed, was 2870 per head per day. Consumption by individuals within this total differed widely. She added that the figures were obtained by dividing the consumption of the country by the population.

Winter Rations in British Zone

Mr. R. W. SORENSEN asked the Secretary of State for Foreign Affairs what calorie scale was likely to operate in the British zone of Germany during the winter; and whether there was an increase of available German-grown foodstuff over last year.—Mr. C. P. MAYHEW replied: It is calculated that the ration in the Combined zone can be maintained throughout the winter at its present level of 1430 calories per day for the normal consumer. Owing to last winter's severe weather followed by the summer drought supplies of German-grown foodstuffs in the Combined zone will be less than last year. Mr. SORENSEN: Can we take it that the ration of 1400-odd calories will be honoured? Mr. MAYHEW: Yes. At least I can say that the stock position, so far as bread grains are concerned, is very much better than last year. Mr. R. R. STOKES: Will the Minister confirm that there is not the slightest chance of doing this unless the imports of food during the October and November months reach 814,000 tons and during December 700,000, and that there is not the slightest possibility of those figures being achieved? Mr. MAYHEW: I think that is over-pessimistic, but I would not like to challenge the figures without notice.

Help for the Children

Mr. SORENSEN asked the Secretary of State for Foreign Affairs what was the position respecting the British contribution to the Children's Emergency Fund of the United Nations; and whether our contribution was financial or in kind.—Mr. MAYHEW: H.M. Government regret that in present economic conditions they cannot make a contribution to the International Children's Emergency Fund either in money or in kind. It is hoped, however, that the fund will benefit from voluntary contributions raised in this country under the United Nations Appeal for Children which H.M. Government have agreed to facilitate. Mr. SORENSEN: Is it not correct that a promise was made that contributions would be made to this fund, and in that case, is not the fund likely to be embarrassed if promises are not honoured? Mr. Mayhew: No. I do not think we are going back on former promises. I should emphasise that it is the Government's contribution that is at stake and not the voluntary one. Mr. D. L. LIPSON: If it is possible for private individuals to send money to this fund, why is it not possible for the British Government to do so? Mr. MAYHEW: There is a limited supply of goods and services which can be supplied overseas. It is better for this to be covered by voluntary contributions rather than Government contributions.

Accommodation in Mental Hospitals

Mr. SORENSEN asked the Minister of Health to what extent overcrowding of patients existed in public mental hospitals; what was the present shortage of staff and closing of beds compared with a year ago.—Mr. A. BEVAN replied: In January patients exceeded the available recognised accommodation by some 16,600 out of 112,000, and 3000 beds were out of use through staff shortage. Comparisons with other years are useless, as accommodation standards were revised in 1946.

Use of Cars by Doctors

Mr. L. HUTCHINSON asked the Minister of Fuel and Power if he would allow medical practitioners, with the limited amount of time at their disposal, and who had to be on call all day and every night, to use their cars for all purposes within a radius of ten miles of their consulting-rooms, in order to permit them some measure of relaxation and yet remain within speedy recall. Mr. H. GAITSKELL: This matter on which I have received certain representations from the British Medical Association is under consideration.

Deaf-aid Prototypes

Mr. F. J. ERROLL asked the Lord President of the Council how many prototypes of the two-piece deaf-aid now being manufactured for free supply to the deaf were produced; how many were tried out on deaf persons, and for what periods of time; and if these persons were given an opportunity of comparing the Government deaf-aid with the best types of deaf-aid currently available.—Mr. H. MORRISON replied: For the final tests, four working models were made of the hearing-aid designed by the electro-acoustics committee of the Medical Research Council. These models were tested at clinics in London and Manchester on 27 persons with various degrees of deafness and well practised in the use of aids. The individual tests of the aid lasted about three hours. Comparison was made in each case with the patient's own previously prescribed aid, and also with a highly recommended American instrument. Twenty of the patients heard best with the new aid, and three others equally well. All the subjects commented on the new aid's exceptionally good reproduction of speech and preferred it on that account.

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In England Now

A Running Commentary by Peripatetic Correspondents

"Is this your medical electric brain?" I asked. "Yes," said the Great Inventor, "it is designed to perform systematically and mechanically what doctors have previously managed by a mixture of astuteness and luck—to notice that one thing varies significantly with another. For example, there has probably been a significant relationship between maternal rubella and congenital deafness for centuries, but it was not till the last few years that anyone noticed it.

"On all these cards I have marked (with the punched-hole system) everything that could possibly influence health—sex, age, habits, hobbies, diet, and so forth. The machine goes steadily through the cards, and whenever it finds that one factor is accompanied by another in a significant proportion of cases it rings a bell and displays the two key numbers and the degree to which they are related. I thought I was going to make hundreds of important discoveries and also be able to stop thinking, which I have always found a strain."

"Wasn't it enormously exciting when the first result came through?" I asked. "It was," he agreed. "I shall never forget the thrill when I looked up the two key numbers and learnt that erythroblastosis fœtalis was four hundred times rarer than the average in the offspring of opium-smokers. I was about to ring up all the big maternity hospitals and suggest that they ordered some opium pipes straight away when I remembered that 99% of Chinese are rhesus-positive and that most opium-smokers are Chinese; hence this remarkable relationship. Since then I have been told hundreds of things by the machine, but many are a bit obvious (such as that carcinoma of the prostate is more common in the male), some are already known (like infective endocarditis being related to tooth extraction), and the rest are largely cryptic, like the opium-smoking sample. Most of these puzzles have turned out to be social medicine in disguise. For example, pulmonary tuberculosis is five times commoner in those without telephones merely means that a small income makes you more likely to get tuberculosis and less likely to get a telephone. The last result that came in is that rheumatic fever is three times commoner in those who sucked dummies in babyhood. You might think this revealed an important relationship between chronic rubber poisoning and an allergic response to streptococcal infections, but I'm not caught that way now and I'm pretty certain it's just that both rheumatic infections and dummy-sucking are commoner among the poor.

"Altogether," he ended with a sigh, "the machine has been rather useless so far and I fear I shall have to think after all if I want to discover anything." "On the contrary," I told him, "I consider you should send your results to THE LANCET forthwith. You have shown that if whenever A occurs B almost invariably happens too, this in no way proves that A causes B. If doctors and research-workers all realised this, the amount of nonsense published would be reduced by at least root sigma chi squared, and the paper shortage would be no more."

* * *

Last week, with cholera still in the news, came the coincidence of a gift of a book from my great-aunt whose uncle was a local pharmacist. Her uncle's book had a lock on the covers. I opened it carefully and out fluttered a four-page pamphlet headed: ANTI-CHOLERA TINCTURE: *Prepared only and sold by D. F. Cooke at the Medical Hall, 18, High Street, Whitechapel, London.* A delicately printed text followed:

> "The ingredients of which this medicine is composed having been eminently useful in India, in cases of Asiatic Cholera, a gentleman was induced to recommend it in this country, on the breaking out of that dreadful disease, and was astonished and pleased to witness the numerous instances in which it proved successful."

After a long discourse, including the assertion of never-failing cure in the English cholera and ending on a truly dramatic note that left today's advertisements cold, there came the customary list of testimonials from Merchants, Skippers, Gentlemen, and an Ironmonger. For instance:

> "Dear Sir, You must please let me have three dozen more bottles of your Anti-Cholera Tincture. . . . The demand for it this summer . . . has been so great that I could have sold almost any quantity. . . . A lad of mine was taken so bad a short time back with an attack of Cholera that he was drawn double with the cramp; I gave him a dose of the Tincture, it relieved him directly, and before the time to repeat it he appeared nearly well; I only had occasion to give him two doses. I am myself subject to violent attacks of bowel complaint, but one dose always sets me to rights. You are quite welcome to make what use you like of this. I remain, yours &c., John Dickinson, Sen. Master of the *Zephyr*. Louth, Lincolnshire."

Another, dated Sept. 24, 1846, read:

> "Sir, I am very glad to have this opportunity of giving my testimony in favour of your Anti-Cholera Tincture: not to say of its good in every instance of Spasm and Bowel Complaints; . . . When I was at St. Petersburg, I could have disposed of a large quantity in a few hours, as, owing to the bad state of the water there, the Bowel Complaint was very bad. . . . I expect to leave Hull shortly for Alexandria, so you will not omit to send me a good supply. I remain, yours respectfully, Thomas Popplewell."

In the book the pharmacist had written, in his well-formed script, many formulæ for Liquid Horse Blisters, Cough Balls, Pick-me-up, Curious Essence, and so forth. He had written his own index, so I looked up the Cholera Tincture. Reduced to a four-ounce size it was:

℞

Gum. camphor. . .	. .	dr. ii
Ol. menth. pip. . .	. .	oz. ss
Tinct. opii . .	. .	oz. i
Sp. vini rect. . .	ad	oz. iv

(Put into half-ounce bottles)

Not so mysterious after all! There is no indication of dosage, but the text mentions "a few drops" as the first dose. It was sold in bottles at 1*s.* 1½*d.* and 2*s.* 9*d.* each, duty included.

* * *

Women doctors, it seems, have rarely been encountered in this part of Canada before. The resistance of an uninoculated community is low. One of our first patients refused any kind of anæsthetic while Alison put fourteen stitches in his arm. Astonishment at her seemed to render him slightly numb. They parted with mutual congratulations and the end-results were very satisfactory. Things have not always gone so smoothly in the surgery since then. One day I was interviewing a patient while Alison scrubbed up. When she emerged ready for action the much impressed French-Canadian seized her hand and kissed it fervently. You couldn't explain that that sort of thing simply holds things up.

* * *

Speaking of tattoos, among the seafarers (not, please, Merchant Navy personnel) who pass in and out of my door the most striking example I have seen was adorning the epigastrium of a wiry A.B. back from a trip to South America. In conversation before my examination began, as often happens nowadays, the question of grub cropped up. "It's all right down there," he said. "Not like this hæmorrhagic country, where a man can't get a bellyful." I made some non-committal reply, and asked him to do the usual—down with the trousers and up with the shirt. He obliged with alacrity and displayed, neatly printed across the appropriate space, the single word EMPTY.

Then there was the young fireman who was clearly reluctant to display his chest. After a little persuasion, however, his shirt came off. Written in blue over one nipple was WATER, over the other MILK. I asked whether this was his own idea, or the suggestion of some exotic practitioner of the art. "Neither," he answered, with an attempt at a rueful grin, "I got very drunk, and my mates had it done." What worried him was not this permanent reminder of a fall from grace, but the explanation he would have to make to his betrothed after their fast-approaching wedding.

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Letters to the Editor

SOCIAL MEDICINE

SIR,—I have been interested to read the recent correspondence, initiated by Dr. Beryl Harding, which has appeared in your columns on the subject of social workers. As Hospitaller of the Order of St. John of Jerusalem I would like to draw attention to the work which has been done, for many years, in this field by members of the St. John Ambulance Brigade—more particularly by the women of the nursing divisions.

In a letter to the *Times* of Oct. 24, Miss M. E. Johnston, secretary of the public-health section of the Royal College of Nursing, mentions the following fields in which the service of voluntary workers would be of value: "Attendance upon doctors at immunisation clinics, dentists at dental clinics, the weighing of children, and the extraction and filing of record cards." These and many other services have been fulfilled by members of the brigade. They have also helped in following up cases, principally ex-Service patients for the Ministry of Pensions; and in order to acquaint those concerned with their readiness to extend this assistance the brigade issued a leaflet to all hospital matrons and almoners, some two years ago, indicating the types of duties they were willing to undertake.

Furthermore the brigade has a nursing aid service, planned in conjunction with the Queen's Institute of District Nursing, and available to any district nurse wishing to avail herself of it. This provides many opportunities of contact with sick members of the community and of putting those in need of treatment, or advice, in touch with the proper authorities.

It is difficult to foresee the exact working of the new health services; but, as a voluntary organisation, the brigade welcomes any indication from public or professional bodies that their services are acceptable. Under the new Act voluntary organisations concerned with ambulance services have been asked to act as the agents of local authorities, and to assume increased responsibilities. Official indication that such coöperation will be acceptable in other spheres would do much to draw fresh recruits to the ranks of the brigade and encourage those who are already endeavouring to live up to the motto of the Order—"*Pro utilitate hominum.*"

St. John's Gate, Clerkenwell, London, E.C.1. ALFRED WEBB-JOHNSON Hospitaller.

PRESENT STATUS OF DISC SURGERY

SIR,—I should like to comment on your leading article of Nov. 1, concerning fusion of the spine after intervertebral-disc operations.

Many successful lumbosacral fusions, using a simple Albee technique, have been done in the past for low backache due to lumbosacral arthritis. These patients present with stiffness of the lower lumbar spine, and radiologically show a diminished L5-S1 disc space with marginal sclerosis and often peripheral osteophytes. This condition can now be recognised as an adaptive change of the joint surfaces in response to the degeneration and resulting mechanical inadequacy of the intervening disc. Nature has, in fact, compensated by the formation of a fibrous ankylosis which is, in some cases, imperfect and painful.

If we now consider bone grafting in general, it must be agreed that success is more constantly achieved with the paired than the single bones of the limbs, and this we ascribe to the splinting action of the intact partner bone. Applying this idea to extra-articular arthrodesis of the hip, we can explain why any variety of graft spanning the joint usually consolidates successfully when applied to the fibrous ankylosis of the healed tuberculous hip, and often fails alone with a relatively mobile joint, as in osteo-arthritis. The less movement there is before operation, the less strain there will be on the graft and thus the greater the chance of successful consolidation.

This conception may explain the varied experiences with spinal fusion after removal of the intervertebral disc. Abnormal mobility of the lumbosacral junction, as a result of the degeneration of the disc, can usually be demonstrated at these operations. This will allow the great forces present at this level, as Falconer states, to hinder or prevent successful fusion by graft. If this argument is correct no modification of technique would materially improve the results.

It would seem, therefore, that the aim should be to hasten the natural adaptive changes at this joint and remove the whole disc as thoroughly as possible, as advocated by Falconer and Dandy. A fibrous ankylosis between the bodies of the vertebræ will develop, and will in many cases be adequate and painless. Other patients may complain of persistent backache and these will be similar to the type of case described at first in this letter. Here mobility of the junction has markedly decreased as gradual approximation and adaptation of the vertebræ have occurred. Fusion can now be done with the knowledge that the anterior ankylosis, although perhaps incomplete, will mechanically protect the posterior graft from undue strain.

As a parallel example, Guri [1] has stated recently that in tuberculosis of the spine fusion fails to prevent mechanical collapse of the vertebræ, but when this has occurred the healed case with a painful fibrous ankylosis can be grafted quite successfully.

I suggest, therefore, on theoretical grounds that primary posterior fusion of the spine by graft after removal of an intervertebral disc is a potentially unsound mechanical procedure, and that alterations of technique can never endow it with universal success. Efforts at achieving anterior vertebral ankylosis, either fibrous or bony, should receive attention. If this fails, late posterior fusion should be done.

David Lewis Northern Hospital, Liverpool. G. V. OSBORNE.

MENTAL HEALTH AND WORLD CITIZENSHIP

SIR,—Some of your readers will be familiar with this title, which is the general theme selected for the International Conference on Mental Hygiene due to assemble in London in August, 1948, as part of a rather larger Congress on Mental Health. This theme has been chosen deliberately in view of the present state of world affairs, in the belief that many of us in medicine—not only in psychiatry—along with our colleagues the psychologists, sociologists, educationalists, and others, have an opportunity of learning to apply some of our understanding of individuals to the problems of group attitudes and international tensions. No doubt psychiatrists should be able to provide the central focus for much of the thinking that is necessary, but they certainly cannot do it alone.

This general theme of Mental Health and World Citizenship has been broken down in a tentative way into various subjects for the different days of the congress: World Citizenship and Good Group Relations; The Individual and Society; Family Problems and Psychological Disturbance; Industrial Relations; Planning and Training for Mental Health. There are in London discussion groups or preparatory commissions composed of men and women from various allied professions, working each of them on one of these days' topics. In some 14 or 15 other countries there are already groups—in some cases, as in the United States, a great many—working on exactly the same topics. Their material as they produce it will be sent in to the central commissions in London, who hope to put it together and send out a monthly summary of all these various points of view to the other groups throughout the world.

This plan of preparatory action has been made because international conferences are often somewhat sterile, and we hope that in this case we shall be able to get a good deal of the work of the congress accomplished before the meeting next August. At that meeting we actually want to exchange ideas and bring each other up to date in these matters. We hope that out of the work of these various preparatory commissions, which are of course on a national basis, and from the work of a residential International Group which we hope will meet before and after the conference, we shall be able to clarify many of the points of agreement and disagreement. It should be possible to delineate many of the subjects which demand continuing research and inquiry in this medico-sociological field; and we hope also to be able to arrive at

1. Guri, J. P. *J. Bone Jt Surg.* 1947, **29**, 136.

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some points of agreement, however simple these may be, which could be of assistance to those two important functional organisations of the United Nations, the World Health Organisation and UNESCO, in the tasks to which their constitutions have committed them.

In this country there are a number of groups being planned, but there are not yet so many as there might be. As chairman of the organising committee of the congress, I am writing now in the belief that many of your readers will feel that this provides them with an opportunity for getting together with colleagues from their own and other disciplines to try to study these topics and see what contribution can be made towards the solution of some of these major problems.

Usually when one talks in any gathering about the general purposes of the congress, about our intention to experiment in presenting group opinions rather than individual communications at the meetings, and about our desire to adventure out of our normal field of work into this wider region, one meets with general approval. It is, however, far from easy in these busy days to get men and women to settle down to serious discussion and to formulate their ideas on paper for the benefit of other people: but this is what we want. Certainly in every academic centre in this country there should be sufficient people with concern for the sanity and balance of society to provide separate discussion groups for each of the five topics; and equally, there are many more isolated areas where perhaps the inter-professional nature of the group might be more limited but yet there are people who could get together and produce much that would be of real value.

Careful studies of much more limited subjects coming within the general field of interest of the main topics would also be welcomed. It is hoped that it may be possible to publish, fully or in summarised form in the documents of the congress, such of them as are specially useful.

I hope that this letter may be taken as an invitation of a somewhat urgent kind to those who feel a concern about these matters to do something, and to get in touch with Professor Flugel (the chairman of the programme committee) or with the programme secretary at the office of the International Congress on Mental Health, 19, Manchester Street, London, W.1.

London, W.1. J. R. REES.

TREATMENT OF BOILS

SIR,—With reference to Dr. Foot's letter in your issue of Nov. 1, I should like to suggest that a more reasonable approach to the problem would be on the lines indicated by Hobbs, Carruthers, and Gough in their recent article in THE LANCET (Oct. 18) on the treatment of sycosis barbæ.

It is now established that *Staph. pyogenes* is almost unique amongst pathogenic bacteria in its ability to live on the intact skin, specially in such regions as the anterior nares, eyes, and external auditory meatus. When a boil develops, the surrounding skin becomes infected with cocci, which incidentally are not affected by the use of systemic penicillin. It is natural for the fingers to investigate such a lesion, and they may readily carry the infection to other parts of the body, including the nose, where the cocci may persist for long periods.[1] In cases of recurrent boils some such site for the carriage of infection can almost always be found, and, in so far as I have been able to compare such strains with those from an actual lesion, they have usually appeared to be identical, and therefore equally virulent.

Treatment based on these considerations aims at the elimination of all pathogenic cocci from the surface of the body. With a first boil, the patient should be warned against contaminating his fingers, and the area round the lesion should be treated with penicillin cream and a dry or tulle-gras covering. The use of systemic penicillin will usually obviate the need for any form of wet dressing. If the local treatment is continued for a few days after complete healing, there should be little risk of further trouble unless the nose has been infected. In the chronic case, fresh lesions are treated on the same lines and the site of carriage is found by culture from wet swabs of nose, eyes, &c., which are best taken in the laboratory. Penicillin cream may be used to disinfect the nose, but if not successful within a fortnight should be replaced by some mild antiseptic ointment to avoid the development of resistance in the cocci.

I have to admit that I have no experience of treatment with manganese. But I should like to point out that Dr. Foot makes no mention of the local treatment which he is accustomed to use in furunculosis and which may have been more effective than he thinks.

London Hospital. F. C. O. VALENTINE.

1. Miles, A. A., Williams, R. E. O., Clayton-Cooper, B. *J. Path. Bact.* 1944, **56**, 513.

MEDICAL FILMS

SIR,—My committee would like your help in publishing some comments on the recent Ministry of Health film, *Poliomyelitis 1947*.

First, we welcome the film as being successful in its aims of conveying information and arousing discussion, and so helping doctors to deal with the epidemic; also as an example of what the Ministry should initiate without delay—a series of films, "Recent Advances for General Practitioners." Such a series could be compared in the field of film with your leading articles or annotations. The great interest shown and the lively discussions throughout the country at showings of *Poliomyelitis* means that a series like this would evidently receive a great welcome.

Secondly, we note that this film does not bear the name or names of the medical advisers responsible for the information given. It is the policy of this committee to recommend that all scientific films should bear the name of the technical adviser. This principle is adopted in the publication of various papers issued by Government departments. May we ask you to lend your support to establishing it in the field of medical films?

Association of Scientific Workers, 15, Half Moon Street, London, W.1. J. D. CHAMBERS, Honorary Secretary, Film Committee.

RENAL CIRCULATION

SIR,—May I be allowed to correct a factual error, and remove an ambiguity, which is contained in your report (Nov. 1) of the meeting of the section of experimental medicine of the Royal Society of Medicine on Oct. 21? Both are contained in the statement attributed to me. The correct statement is as follows:

> "There is considerable evidence that the gross hæmorrhages which occur in the portal tracts, and are the initial lesion in dietetic massive necrosis of the liver, are due to swelling of the parenchymal cells impeding the intralobular circulation and so damming back the blood in the portal tracts. The same dietetic measures when applied to very young rats of 40–50 g. weight, produce not only the necrosis in the liver but a hæmorrhagic necrosis in the cortex of the kidney. This is particularly so if the diet is deficient in choline, and Dr. Baxter, working in Professor Best's laboratory in Toronto, has evidence that the cortical hæmorrhagic lesions in this condition are a secondary phenomenon, secondary to circulatory disturbance consequent on the gross swelling of the parenchymal cells. The relevance of these observations to the discussion on the renal circulation is that in these experiments we have a type of cortical necrosis in which the circulatory impairment is the result, rather than the cause, of the lesion."

University College Hospital, London, W.C.1. H. P. HIMSWORTH.

DIABETIC NEUROPATHY

SIR,—The annotation on Oct. 25 made no mention of Charcot's joints. In the October issue of *Abstracts of World Medicine* (p. 403) is a report on 2 cases, both in males. The publication of these 2 cases and the absence of all mention of the condition from your more comprehensive survey tempts me to report a case now under my care in hospital.

My patient is an unmarried woman, a school teacher, who has been a mild diabetic for many years. Until she entered hospital for the investigation of diarrhœa no neuropathic symptoms had been noticed. Some minor mental symptoms have appeared since she has been in hospital, with features suggestive of myxœdema; but these have not responded to thyroid therapy. The swelling and joint destruction of

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Charcot's disease appeared very insidiously in a leg already swollen as a result of venous thrombosis. There was very slight pain or vague aching in the left knee, but destruction within the joint progressed rapidly until in a few weeks the knee was completely disorganised. The nature of the lesion was confirmed by X-ray examination. When looked for, other evidences of neuritis were found: muscle tenderness, loss of tendon reflexes, and loss of vibration sense. Loss of cutaneous sensibility is not pronounced, and the limbs are free of trophic ulceration. The Wassermann reaction is negative, and there are no signs of tabes, general paralysis, or syringomyelia. Balancing of the diabetic condition and administration of vitamin B_1 have done nothing to arrest the rapid advance of joint destruction.

I have not succeeded in finding other reports of cases like this. I have not previously seen Charcot's disease with diabetes and would be interested to know if the association is as uncommon as I believe it to be.

Plymouth. T. H. G. SHORE.

MASS RADIOGRAPHY IN FACTORIES

SIR,—May I correct a false impression which may have been caused by a statement in your report (Nov. 1, p. 676) of the mass-radiography service started by the Ford Motor Company? According to the report, this is "said to be the first installed by a factory." This firm had a mass-radiography unit installed in its surgery on Sept. 12, 1941, and it has been fully functioning ever since.

J. V. MANNING
Pilkington Brothers Ltd., St. Helens, Lancs. Medical Officer.

AMŒBIASIS IN CEYLON

SIR,—In his article (Oct. 25) Dr. Parkinson makes two statements that particularly call for comment.

Discussing the efficacy of sulphonamides in the treatment of bacillary dysentery he says that "it has become the custom in many hospitals overseas to use these drugs as a diagnostic test in cases of dysentery. . . ." I hasten to point out that this practice, which is indefensible in the presence of laboratory facilities, was certainly not the custom in R.A.M.C. hospitals in the Middle East, where a great deal of bacillary dysentery was seen and where there was no dearth of amœbic dysentery. It was early appreciated that not all cases of bacillary dysentery responded to sulphonamides; nor did these refractory cases respond to anti-amœbic treatment. They could therefore not be considered "missed amœbics."

Dr. Parkinson has rightly emphasised, as have others before him, the importance of adequate treatment for acute amœbiasis before it has had the chance to become relapsing; but a false and very dangerous sense of security will be engendered if the follow-up is too short. Of his 42 cases, 15 were reviewed after an interval of two to four months, with no evidence of relapse on sigmoidoscopic inspection and examination of three stools. No mention is made of whether the stools were fluid and obtained after purgation. I consider this important as many an apparent cure has broken down with a little purgation. I wonder what the stools of the 4 cases that had had further diarrhœa would have revealed if examined during the periods of diarrhœa.

Dr. Parkinson writes that "the results, both immediate and remote, of this treatment have been impressive. . . ." Surely the immediate results are no better than those usually obtained with many different schemes of treatment relying on combinations of emetine, carbarsone, and emetine bismuth iodide without sulphonamide. There is no evidence that the addition of sulphonamide to the standard "combined" forms of treatment for acute amœbiasis, as opposed to chronic relapsing amœbiasis, offers any immediate advantage. Remote results are not given by Dr. Parkinson; two to four months cannot be considered remote in a condition that is well known for its late relapses. My disagreement with Dr. Parkinson is not that he has neglected to follow up his cases for a long period—that was probably impossible under Service conditions—but that on the basis of a follow-up inadequate both in method and duration he has recommended a line of treatment.

It is my practice to readmit patients for purgation and examination of six fresh liquid stools, and for sigmoidoscopy with scraping of any suspicious areas, at the end of six weeks, three months, six months, and one year. This I believe to be justified by the importance of prompt treatment for relapses; it is equally important for the chance it offers of appraising the form of treatment.

I would like to end with a special plea for protracted and thorough follow-up, without which our knowledge of therapy must remain incomplete.

Chase Farm Hospital, Enfield, Middx. G. RIDDELL ROYSTON.

SEPTIC FINGER

SIR,—Your leading article on Oct. 25, and the three papers published in that issue, raise many important points. So often is a new form of treatment (like penicillin) hailed and used as a panacea, that two of your statements should be plastered up all over the land: "Penicillin is not a substitute for properly planned surgery"; and "No kind of chemotherapy can supplant the evacuation of pus."

It is most gratifying to see that surgeons and others dealing with infected fingers are at last beginning to realise the importance of the relief of tension at the outset of treatment. In my opinion, the dangerous increase of tension associated with these infections is probably responsible for more damage than the infection itself. I feel that the statement about pulp infections applies equally well to the whole hand: "Once tension has been relieved by suitable incisions . . . only meddling will prevent healing in a reasonable time." Might I add to this—provided proper attention is paid to ensuring adequate drainage and active movement from the beginning. With regard to the "hockey-stick" skin incision, advocated by Bolton and others, I would question the necessity for dividing all the fibrous septa, and also the need for two lateral incisions for this purpose. I feel that neither practice is necessary as a routine measure, that they might often be dangerous in opening up uninfected tissues, and that they cause unnecessary damage and deformity to the finger. I agree with Cruickshank and Harrison that minimal skin incision alone is necessary, and pus should be sought for and let out by Hilton's method, to avoid damage to deeper structures. With careful supervision of after-treatment it is quite simple and safe to enlarge the drainage opening if it is inadequate or if pocketing occurs. Excision of infected bone before separation of sequestra is dangerous and meddlesome surgery, as also is early excision of sloughing tissue, even under a cloak of penicillin. Neither will be necessary if early incision with relief of tension and adequate aftercare are carried out. When patients are seen late on and some necrosis of soft tissue or bone has already occurred, it is wiser and safer to let the dead tissue separate off before attempting to remove it.

Bolton and his associates inveigh against hot soaking with early movement, and I am amazed to see that your editorial backs them up. I have employed this form of treatment for the past seventeen years, and I have never seen any but a perfect functional result, with rapid healing. Admittedly the skin becomes sodden after some hours' soaking, but this does no harm whatsoever and is never a reason for stopping. The benefits that accrue in the shape of an improved blood-supply and the relief of pain, allowing of a great increase in active movement, greatly facilitate the escape of pus, promote rapid healing, and prevent residual stiffness. Secondary infection can be avoided with reasonable precautions.

I would strongly deprecate splinting even for a few days. There is no need for the physiotherapist later on to try to get rid of residual stiffness, since this can be prevented from the start. Short-wave diathermy as a form of heat, applied for ten minutes daily with supervision of movement later on—"once contact has been established"—is a very poor substitute for active movement from the outset. When the patient is told that it all depends on him, it is surprising how hard he will work to get normally mobile fingers or hand. And how much better for his morale than letting him feel it is all being done for him! More self-help means fewer stiff fingers.

Hypertonic dressings are devoid of any virtue or value and should be discarded. They neither increase the blood-supply, promote free drainage, nor facilitate

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movement. Penicillin, by three-hourly intramuscular injection, may be a useful adjunct to treatment, especially with bone involvement. But it is not a substitute for good surgery, and only too often its use has been the reason for bad surgery, or none at all. As regards tendon-sheath infections, I am most surprised that Cruickshank and Harrison had one stiff finger and another needing amputation, out of 13 cases. I feel that these would probably not have occurred if they had added hot soaking with active movements right from the start to their otherwise admirable régime. Prevention is better and safer than rehabilitation for stiff fingers, and it is quite possible even over 55 years of age. They suggest that the use of penicillin should reduce the incidence of secondary tendon-sheath infections. The adoption of sound surgical principles will achieve this end with much more certainty and will allow the penicillin to penetrate through and around the infected area, by relieving the tension and restoring the circulation. Drainage is not necessary, either by means of 'Vaseline' gauze or rubber drains, if the incision is properly placed and hot soaking with active movement is adopted from the beginning.

Webster explains that some of his patients refused injections of penicillin in beeswax and oil, because of local reactions, but these people recovered as quickly as others who continued with the injections. Surely this seriously detracts from the value of penicillin in beeswax and oil for these infections, as well as emphasising the possible danger of injecting masses of insoluble wax and oil into patients' muscles.

Local injection of penicillin around the incision or into the nail-fold would appear to have nothing at all to commend it. It would not diffuse so widely as penicillin in the blood-stream, provided the circulation of blood and tissue fluids is made possible by the relief of tension. On the contrary, it would tend to cause further increase of tension with great increase of pain (as found by Webster), and the risk of more tissue necrosis. The method advocated by Whitwell (Nov. 1) does not seem to be any better, and it is definitely less certain than the relief of tension together with hot soaking and active movements. In my experience it is never necessary to remove the whole nail, and doing so leaves a raw tender area which is extremely touchy for weeks. It may rarely be necessary to remove part of one side of the nail to improve drainage, and the rest may slough off later on. But by this time the new nail has grown down beneath, for some of the distance at least, and the exposed area beyond is no longer raw and tender.

Undoubtedly many cases will resolve without suppuration if treated early with systemic penicillin, provided there is an adequate circulation in the infected area for the drug to reach it. But in many cases an adequate circulation cannot be maintained without early incision to relieve tension, which is a far safer way of discouraging further spread of infection.

A septic finger with a "slough in the tissues by the time that treatment is started" should surely be labelled "too late" instead of "early." Would it not be possible to catch cases even earlier and avoid necrosis altogether, since it is possible to catch them "so early"?

Mount Vernon Hospital, Northwood. ALAN SHORTER.

A BOOK REVIEW

SIR,—In your footnote to my letter published in your issue of Nov. 8 you say, referring to the influence of maternal rubella in the ætiology of congenital cataract: "This important contemporary discovery is not, however, accorded a place in the sections on Cataract, Diseases of the Lens, or the Development of the Eye," but you mentioned at the beginning of the footnote that I was right in saying that the subject was mentioned on p. 54 of the book in question. The first words on p. 54 are: "Chapter VI. Development of the Eye and its Adnexa." I submit, Sir, that you have followed in the steps of your reviewer in that you have made an untrue statement.

London, W.1. J. H. DOGGART.

*** This error was introduced in compressing our reviewer's rejoinder. Mr. Doggart seems to win on points—if only points of detail.—ED. L.

GAUCHER'S DISEASE WITHOUT SPLENOMEGALY

SIR,—With reference to the article by Dr. Morgans (Oct. 18) and the remarks of Dr. G. A. Matthews (Nov. 8), the following brief report may be of interest.

Recently I have performed the post-mortem examination of an infant, aged 3 months, who suffered from malignant hepatoma. The spleen was normal in size (16·1 g. in weight). It had a peculiar pallid appearance and the capsule seemed slightly roughened. On the section the malpighian bodies were not discernible and the pulp had the appearance of a miniature honeycomb. In histological sections the pulp was found to be packed with large pale cells, about 25 μ in diameter. The nuclei were small, hyperchromatic, and in most cells excentric. The cytoplasm was colourless in the hæmatoxylin-eosin stain, except for a very fine network of mainly radially arranged fibrils which consisted of rows of tiny granules. In trichrome stains the cells appeared pale blue. The cytoplasm did not stain in frozen sections with Herxheimer's Sudan IV stain, and it was pale brownish-yellow in the Smith-Dietrich stain. No anisotropic substances were found in these cells when examined in polarised light. The chemical analysis of the lipoids in this spleen is being carried out in association with Dr. E. Hickmans. The Klenck-Chargaff method of fractional extraction is being used and all that can be said at the present time is that the bulk appeared in the ethereal fraction in which cerebrosides are expected. Only minimal traces of the latter are present in normal spleens.

Although the final diagnosis depends on the identification of the lipoid as kerasin the findings strongly suggest Gaucher's disease without splenomegaly.

Pathology Department, Children's Hospital, Birmingham. H. S. BAAR.

THE BARBITURATES

SIR,—Your leading article of Oct. 18 was of great value to the vast number of doctors who prescribe barbiturates regularly.

A further point that should be stressed is the necessity, before prescribing barbiturates in cases of anxiety state and other functional disorders, of excluding organic disease. Sir Adolphe Abrahams et al.[1] recently pointed out in an article on acute porphyria the harm which may be done by barbiturates, which, in his case, may possibly have led to the death of the patient. Moreover, barbiturates may mask important symptoms and signs. Perhaps the following case will help to clarify this point.

A married woman, aged 40, was admitted to a mental home in 1943, with the diagnosis of anxiety state. Early in 1946 she was discharged, improved but not cured. Practically all the time she was on barbiturates. Even after her discharge, she was still taking 'Sodium Amytal' gr. 6 and 'Medinal' gr. 10 within 24 hours. Her symptoms were still the same—mental instability, lack of decisive power, disturbed coördination of speech, general weakness, and hunger-pain.

Her husband, a colleague, brought her to me in August, 1946, for the exclusion of organic disease as the cause of her mental symptoms. Investigation revealed a true hypoglycæmia, which had been masked for years by barbiturates. Since recognition of this condition she has had no barbiturates. Her nervous instability and anxiety disappear immediately after taking sugar. She is fit again to look after her own affairs. The blood-sugar, after 50 g. of glucose, showed a drop at $2^1/_4$ and $3^1/_4$ hours to 65 mg. and 60 mg. per 100 ml. At this stage, the mental symptoms were severe.

London, W.1. LEO RAU.

ALOPECIA AREATA TREATED WITH THORIUM-X

SIR,—In his paper of Oct. 4 Dr. Feeny has brought forward some valuable observations. It seems, however, that one or two points in the assessment of the results and of the value of treatment have not received the attention they deserve. The first is the time factor. The tendency for alopecia areata to spontaneous recovery is well known, though growth may often be delayed months or even years. It seems likely that some at least of the success could be accounted for by spontaneous regrowth. Secondly, little is said of the importance of the psychotherapeutic effect on the patient of a new treatment,

1. Abrahams, A., Gavey, C. J., Maclagan, N. F. *Brit. med. J.* Aug. 30, p. 327.

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especially with radioactive substances. At least an atmosphere of encouragement and hope is to be expected with a new procedure. Lastly, the author gives no hint of having considered the possibility that radio-inactive paints and varnishes might produce regrowth of hair just as effectively and as quickly as thorium-X in alcohol or varnish. Shortly after the appearance of Corsi's paper (*Lancet*, 1934, ii, 346) we agreed to try painting areas of alopecia in the scalp in equal halves—the one half with thorium-X in alcohol, the other half with the alcohol vehicle alone. We found in a series of cases that the hair grew as quickly and as well in the part which had received no thorium, and there was no detectable difference in the response in the two adjacent areas. In 2 out of one series of 30 cases, thorium-X seemed to have a retarding effect on hair growth, as new hair appeared on the untreated halves of the patches some weeks earlier than on the sides which had received thorium-X.

We realise the difficulties of adequate control of results in clinical trials, but we do not feel that the evidence given in his paper warrants the conclusion drawn by Dr. Feeny that the hair regrew solely, or even chiefly, because of the thorium used. We both use thorium-X regularly, but no longer for treating alopecia.

Oxford. ALICE CARLETON.
Cambridge. C. H. WHITTLE.

Obituary

WILLIAM HENRY KAUNTZE

C.M.G., M.D. MANC., M.B. LOND., F.R.C.P.

Dr. W. H. Kauntze, medical adviser to the Secretary of State for the Colonies, died at Woking on Nov. 4.

Born in Manchester in 1887, the son of Mr. W. G. Kauntze, he was educated at Manchester University but also took a London medical degree. After qualifying in 1911 he acted as house-surgeon at Manchester Royal Infirmary and later as resident medical officer at Salford Infirmary. Shortly before the outbreak of the first world war he entered the Colonial Medical Service, and he served as a medical officer in Nigeria till he was posted to the East Coast when the West African troops were moved there in 1916. With the rank of major he served in the field with distinction, and in 1919 he was appointed senior bacteriologist and deputy director of laboratory services in Kenya. On leave in England he attended the first post-war course in tropical medicine at the London School of Hygiene, taking his D.P.H. in 1921. This enthusiasm for his work was characteristic, and Dr. N. P. Jewell, who collaborated with him in *A Handbook of Tropical Diseases* (1931) writes: "Kauntze studied assiduously, keeping up to date by avid reading of medical literature, and he had a splendid knowledge of his profession. In Kenya, he became very popular, both for his great medical ability and his ready willingness to help in trouble."

Lafayette

In 1932 Kauntze was made director of medical services in Uganda, and he held this post for nearly ten years. During this period he interested himself in tropical pathology and published a number of papers on dysenteric vaccines and their application to the treatment and prevention of bacillary dysentery. In 1941 he was recalled to England to become assistant medical adviser to the Colonial Office, and towards the end of 1944 he was appointed chief medical adviser to the Secretary of State.

After the end of the late war he travelled widely by air, visiting Africa, the West Indies, and the Far East. He undertook these fatiguing journeys at the cost of great pain and discomfort, for he was already a sick man. In his later years he became a sincere student of social medicine in the tropics, and in 1946 he summarised his views in a valuable article in the *Practitioner*. Clear in ideas and in expression, he was an excellent chairman, and in this capacity served on many committees. Sir Philip Manson-Bahr speaks of his "gentle and particularly attractive character. Kind and considerate to all around him, he loved the service to which he had devoted his life, and no trouble was too much for him in order to improve the conditions of service for his officers."

"A year or two before the war," writes Sir Wilson Jameson, "I had the privilege of travelling through part of Uganda with Dr. and Mrs. Kauntze and of spending some little time with them in their delightful home on the shores of Lake Victoria. I knew Dr. Kauntze before then, but I got to know him much better during my visit to his own territory. He was a first-class director of medical services, and as soon as war-time conditions permitted his release from Uganda, he joined the headquarters staff of the Colonial Office. Ultimately, as chief medical adviser, he was able to press forward with some of the plans on which he had set his heart—the expansion and improvement of the colonial medical schools, the creation of a research organisation, the development of a more preventive outlook in the Service generally. He travelled extensively throughout the colonies, and his wide knowledge was invaluable in the conferences that have been held in connexion with the establishment of a World Health Organisation. He was the most unassuming of men and he never spared himself. His work always took first place. At the meeting of the Interim Commission of the World Health Organisation at Geneva last Easter, when he knew his illness was mortal, his one desire was to complete the task he had set himself. Kauntze has died just when he was most needed by the Service in which he spent his professional life. But his good influence will be felt for years to come. We at the Ministry of Health have lost a very helpful and lovable colleague."

Dr. Kauntze married in 1919 Miss Edith Johnston, of Cape Town, and they had one daughter. He was appointed C.M.G. in 1937, and he was elected F.R.C.P. in 1945. Recently he was made a knight of the Order of St. John of Jerusalem.

Public Health

Poliomyelitis and Polioencephalitis

THE decline in notifications has continued. Those for the week ended Nov. 1 were: poliomyelitis 221 (251) and polioencephalitis 22 (29). The decline of prevalence is, however, much less steep than was the rise; and it now seems probable that for the remainder of the year incidence will remain at a much higher level than is usual in winter.

Infectious Disease in England and Wales

WEEK ENDED NOV. 1

Notifications.—Smallpox, 0; scarlet fever, 1529; whooping-cough, 1037; diphtheria, 178; paratyphoid, 15; typhoid, 4; measles (excluding rubella), 2052; pneumonia (primary or influenzal), 502; cerebrospinal fever, 39; poliomyelitis, 221; polioencephalitis, 22; encephalitis lethargica, 0; dysentery, 126; puerperal pyrexia, 100; ophthalmia neonatorum, 41, relapsing fever, 1. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or measles, 1 (0) from scarlet fever, 3 (0) from diphtheria, 4 (1) from whooping-cough, 51 (3) from diarrhœa and enteritis under two years, and 16 (2) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 203 (corresponding to a rate of 26 per thousand total births), including 34 in London.

THE British Standard for Film Strip and Film Slides has been revised. Copies are obtainable, price 2*s.*, from the sales department, British Standards Institution, 24, Victoria Street, London, S.W.1.

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Notes and News

EMPIRE MEDICAL ADVISORY BUREAU

THE council of the British Medical Association have made a timely and friendly gesture in setting up this bureau to help doctors from overseas who are visiting this country. A committee of management has already been appointed, and this week applications are invited (in our advertisement columns) for the position of director. When the bureau is in action visitors will be able to turn to it for information about postgraduate study and about suitable lodgings and hotels, as well as for letters of introduction to their British colleagues, both specialists and general practitioners. But it will not be bound by academic and professional limits. To the stranger everyday life in this country must often seem bewildering and intricate; his ration book is in a mysterious code, tickets for the ballet are hard to come by, and he is uncertain where the Derby is run. With all these problems the bureau will lend a helping hand. In short the new director's job will be to enable his visiting colleagues to feel at home and find their way around.

THE SURGEON AND THE ID

A SUCCESSFUL analysis, they say, must be founded on a good "transference" between psycho-analyst and patient. But neurotics, who are as chancy—or as predetermined—in their likings as anybody else, may form their transferences with quite the wrong people. The frustrate young man in Mary Renault's latest book, *Return to Night*,[1] chooses a surgeon. Luckily for him she has read some psychology, and when not being pompous about her work (a weakness not entirely confined to surgeons, after all) is a mature and pleasant person. The young man has been hamstrung for any part in real life by his deep attachment to his mother and by the love and hate she bears him.

Here, then, are materials for a psychological study of two people whose love for each other is hampered by disparity of years (the surgeon is much the older), old bondage, unfamiliar crises, and purely practical obstructions—ample material, little of which is wasted. But the discontented Miss Renault throws in all sorts of extras—underground caves, fighting drunks, calumny, runaway horses, and finally an unlikely premarital experience for the frigid mother. What do we want with these Jane Eyre-ish accessories? Her characters, caught in their inward web, are living at many levels; their conversations are haunted with overtones; they are forever blundering and trespassing, healing, and restoring. But, into this personal adventure, drama keeps breaking so destructively that Miss Renault has to summarise whole phases; and indeed at her tenth chapter, in a few pages of bald exposition, reduces her own carefully wrought mystery to dust. Her trouble is that she doesn't know how well she writes. The book, however, has been awarded the Metro-Goldwyn-Mayer prize of £40,000 as the outstanding novel of the year, and will shortly be filmed. No doubt the caves and so forth will prove a Metro-goldmine.

BY WOMEN FOR WOMEN

SMALL and intimate, staffed entirely by women, the Marie Curie Hospital occupies a Victorian house in Fitzjohn's Avenue, Hampstead. The original hospital, founded in 1929, for the treatment of women with cancer, by the London Association of the Medical Women's Federation, was destroyed by a bomb in 1944, and this second building was opened in May, 1946, with 11 beds. On Oct. 22 when H.R.H. the Duchess of Gloucester opened the new nurses' home, Lady Moran, the chairman of the board of management, was able to announce that there are now some 50–60 beds in action, and that, when times allow, it is hoped to build a new hospital on the old site which will bring the full complement of beds up to 100. Fortunately the Helen Chambers research laboratory was undamaged. Since 1944, when an appeal was launched after the bombing, the hospital has received donations to the value of £120,000 from the public, and has been able to acquire, besides the new hospital building, two new houses to receive nurses and domestic staff, and another house in Fitzjohn's Avenue which will be used by ambulatory and convalescent patients, thus sparing beds in the main hospital.

The new nurses' home, also a Victorian building, has the same friendly and intimate quality as the hospital. The rooms, of various shapes and sizes, with agreeable and unexpected differences of structure, decoration, equipment, and outlook, gain fresh individuality from the taste of the owners; nothing could be less institutional or stereotyped. The whole building is well warmed, and there are good kitchens, a roomy pantry where the sisters can make tea or do their froning, a large comfortable sitting-room, and a pleasant garden.

Sir William Douglas, secretary of the Ministry of Health, who replied to the Duchess of Gloucester's good wishes for the future of the hospital and of the new nurses' home, advised all donors to give at once, since money given before the appointed day will be used for the individual hospitals on which it is bestowed. Alderman Mrs. R. S. G. Carnegie, the mayor of Hampstead, spoke of the hope of future discoveries in the research department of the hospital.

CHRISTMAS SEALS

THE National Association for the Prevention of Tuberculosis has growing commitments: the number of Colonial training scholarships for doctors and other health workers has been increased, and last July a conference held in London was attended by over a thousand delegates. For the continuance of its work the association looks largely to proceeds from the sale of its Christmas seals, from which source about £250,000 has been obtained in the last ten years. This year the seals, presented as in previous years by the Canadian Tuberculosis Association, depict in cheerful colours a team of oxen bringing home the Yule log. The seals may be obtained, at a cost of 4*s.* per sheet of 100, from the Duchess of Portland, Chairman N.A.P.T., Tavistock House North, Tavistock Square, London, W.C.1.

EARTH-EATING

IT is hard to see why the idea of earth-eating excites repulsion, whereas the prospect of eating a dead animal seems unobjectionable—pleasant, indeed. Patients will swallow chalk or kaolin without demur when earth in such forms is prescribed by the physician; and minerals derived from the earth, such as salt, iron, and mercury, rouse no distaste when offered in food or medicaments: and what is a barium meal but geophagy? No doubt the mother's horrified conviction that earth-eating is "dirty" makes a strong impression on the young child; and the association of pica with mental disorders and with parasitic infestations later heightens such disgust.

Yet in many parts of the world, as Robertson[1] points out, earth is eaten either for medicinal reasons or as a fertility rite. He quotes Dr. Leonhart Ranwolf, who in the sixteenth century noted that the women of Tripoli ate an earth called *jusabar*. Sir George Watt found the same practices in India in 1908. A comestible clay, found near Koluth, is sold in the bazaars to improve the complexion. The edible earth most commonly eaten is said to be a light yellow ochre, called *multani mitti*, which is taken in doses of about gr. 5–30 to relieve acidity of the stomach. Other edible earths are *Sang-i-Basri*, imported from the Persian Gulf and used in tonic preparations; a sweet-scented earth called *Sausrastra mrittika*, given as an astringent for internal bleeding; and the goa-stone, made from fine fuller's earth, compressed into the form of a large egg and scented and gilded, a little of which is scraped off and taken in water as a remedy for many disorders. Potter's earth for eating is sold in the Calcutta bazaar in partly baked saucer-shaped chips about 2 in. in diameter. Robertson considers that most of the earths eaten in India are fuller's earth containing the clay mineral montmorillonite, as well as some silica.

The "Samian stone" mentioned by Pliny, between A.D. 23 and 79, is thought to have been a compact form of kaolinite such as lithomarge. Chaucer mentions "bole armoniac," or Armenian earth, which was used as an antidote for poison, and for stanching wounds. This early reputation of adsorbent earths received scientific confirmation only as late as 1914, when J. A. Lloyd reported that the finer particles of fuller's earth would remove alkaloids from solution; and the next year B. Fantus noted that fuller's earth was beneficial in cases of morphine, nicotine, and ipecacuanha

1. London: Longmans, Green. Pp. 356. 10*s.* 6*d.*

1. Robertson, R. H. S. *Discovery*, 1947, 8, 213.

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poisoning, and even—though to a lesser extent—in poisoning with strychnine and aconitine. Some fuller's earths are more effective than others; and of English earths, those from Redhill, Surrey, and from the neighbourhood of Bath are the most adsorbent.

The two main types of clay used in medicine—fuller's earth and kaolin—are often thought to be identical but are in fact quite distinct both mineralogically and in physical properties.

University of Cambridge

On Nov. 1 the following degrees were conferred:

M.A.—R. M. Fry.

M.D.—Edward Clayton-Jones, C. R. T. Lane, R. T. Mummery, W. A. Nicholson, P. D. Scott, W. H. K. Willis.

Dr. J. Hoogstraten has been appointed to an Elmore medical research studentship.

University of Edinburgh

On Oct. 25 the following degrees and diplomas were conferred:

Ph.D. (in the faculty of medicine).—Y. Y. Akrawi.

B.Sc. (second-class honours).—G. A. C. Summers.

D.P.H.—*K. A. Brahmabhatt, *V. D. R. Martin, *J. A. Miller.

D.M.R.—*T. A. B. Mason.

* In absentia.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Nov. 4, with Dr. D. M. Lyon, the president, in the chair, the following were introduced and took their seats as fellows:

H. M. D. Shepherd (Shanklin, I.o.W.), P. M. Wood (Halifax), John Craig (Aberdeen), J. McG. Rogan (Glasgow), J. M. Macfie (Edinburgh), A. W. Wright (Edinburgh), Charles Cameron (Edinburgh), Neil Macmichael (Edinburgh), J. A. L. Gilbert (Edinburgh).

The following were elected fellows:

J. D. M. Claassens (Cape Town), J. M. Watt (Johannesburg), I. N. Sutherland (Edinburgh), Gurbuxsh Singh (Amritsar, India), R. O. Gillhespy (Paisley), J. G. Macleod (Edinburgh), G. M. Wilson (Edinburgh), R. S. Aitken (Aberdeen), T. G. Brown (Hamilton).

The following were elected members:

W. H. Rose, K. G. W. James, A. S. R. Stewart, Jack Rudolph, J. A. Ross, J. B. H. MacArthur, I. H. L. Gillies, H. J. T. Ross, W. J. G. Barrie, W. G. MacDougall, J. W. Rae, K. K. Datey, E. M. Heller, H. G. H. Richards, J. K. Drummond, H. G. H. Houghton, Niels Pedersen, P. E. Brown, J. W. Buchanan, M. W. Archdall, Thomas Black, G. B. Tait, A. W. O. Taylor, D. E. Williams, Aneurin Hughes, W. L. Sharp, Alexander Skene, H. R. L. Fraser, N. W. Horne, J. B. Lowe, H. D. Ross, Erich Kahn, Malcolm Watt, A. E. Claireaux, J. W. T. Pretsell, A. G. Harper, T. McS. Wilson, A. K. Das, H. C. W. Stringer, J. T. R. Russell, Constance C. Forsyth.

The Freeland Barbour fellowship for original investigations carried out in the laboratory of the college was awarded to Lieut.-Colonel W. F. Harvey.

Royal College of Surgeons of England

Sir William H. Collins professorship of human and comparative pathology.—The council invites applications for this chair. The salary will be not less than £2000 per annum, and particulars may be had from the secretary. Applications with the names of two referees must reach the college, Lincoln's Inn Fields, London, W.C.2, not later than Dec. 31.

The museum of the college in Lincoln's Inn Fields, London, W.C.2, is again open to doctors and medical students daily from 10 A.M. to 5 P.M. (1 P.M. on Saturdays), but owing to shortage of accommodation the anatomy museum is sometimes in use during the afternoon for lectures. The collections are still much depleted by enemy action, but the following series are sufficiently complete for exhibition:

Anatomy: specimens illustrating the nervous system and integument are arranged and labelled; specimens illustrating other systems are available for study, but are not yet permanently arranged or labelled.

Pathology: diseases of the skeleton, nervous system, and alimentary system; teratology; and a special group of selected Hunterian specimens.

Medical War Relief Fund

The committee of this fund has decided that it is unnecessary for supporters to send further contributions, as applications for assistance are now relatively infrequent. Though some of the present beneficiaries are likely to need help for some years, the committee is satisfied that, by the time the existing balance of some £24,000 has been exhausted, the fund will have discharged the temporary function for which it was established. The committee expresses its gratitude for the support received from the profession at home and overseas during the past seven years.

Royal Faculty of Physicians and Surgeons of Glasgow

The following office bearers have been elected for the ensuing year: president, Dr. G. B. Fleming; visitor, Dr. W. R. Snodgrass; treasurer, Mr. W. W. Galbraith; librarian, Dr. A. L. Goodall; representative on the General Medical Council, Mr. Andrew Allison; councillors, Mr. D. McKay Hart, Mr. A. B. Kerr, Mr. J. H. MacDonald, Mr. E. G. Oastler, Mr. Charles Read, Mr. W. A. Sewell, Mr. G. H. Stevenson, Mr. Matthew White, Dr. G. M. Wishart, Dr. J. H. Wright.

London School of Hygiene

The following awards have been made to students of the course for the academic diploma in public health held at the school during the session 1946–47:

Chadwick prize.—Dr. J. H. F. Brotherston.

Association of Industrial Medical Officers prize.—Dr. J. N. Morris.

Hecht prize.—Dr. M. E. R. Balfour and Dr. T. McL. Galloway.

Industrial Health Congress

The ninth International Congress on Industrial Health will be held in England from Sept. 12 to 17, 1948. The secretary of the congress may be addressed at 14, Hobart Place, London, S.W.1.

Immunisation against Influenza in U.S. Army

All personnel of the United States Army are being inoculated against influenza. In addition to the A and B viruses, the vaccine contains an A variant cultured last season during a distinctive type of outbreak in New Jersey. Laboratory tests will be made in the field to establish outbreaks.

Chloroform Centenary

To mark the centenary of Sir James Young Simpson's discovery of chloroform in Edinburgh on Nov. 4, 1847, the university conferred the honorary degree of LL.D. on Dr. H. W. Featherstone, founder-president of the Association of Anæsthetists, and on Sheriff T. B. Simpson, a grand-nephew of the discoverer. The celebrations, reported in the *Scotsman* of Nov. 5, included a lecture by Dr. Douglas Guthrie.

Cancer Control Programme

A scheme for the twice-yearly examination of all women over the age of 40 is reported by B.U.P. to have been approved by the Delaware division of the American Cancer Society. For the examination, which is to be of the breasts and pelvic organs, the charge will be $3; but those who cannot afford to pay will be helped from the society's funds.

St. Leonard's Hospital, Shoreditch

The Minister of Health has appointed Mr. V. Zachary Cope, F.R.C.S., and Miss M. F. Dykes, S.R.N., to hear on Nov. 18 an appeal made by the London County Council against the decision of the General Nursing Council to withdraw recognition of this hospital as a training school for nurses. As reported last week (*Lancet*, Nov. 8, p. 704) 33 doctors have signed a memorandum regarding the threatened closure of the inpatient wards at the hospital as a result of the withdrawal of recognition.

U.S. Atomic Energy Commission

Dr. Shields Warren has been appointed interim director of this commission's new division of biology and medicine. Dr. Warren is director of the Massachusetts State Tumor Diagnosis Service and assistant professor of pathology at Harvard University. The division will correlate programmes of medical and biological research and will direct the commission's health physics work and industrial hygiene activities.

Royal Institute of Public Health and Hygiene

Prof. E. D. Adrian, O.M., F.R.S., will deliver the Harben lectures at the institute, 28, Portland Place, London, W.1, at 3 P.M., on Monday, Tuesday, and Wednesday, Dec. 15, 16, and 17. The title of the series is the Organisation of the Nervous System, and in the three lectures he will deal with the elements of nervous activity, the effects of the sense organs, and the activity of the brain.

International Organisation against Trachoma

At a meeting of this organisation's executive committee in Paris last May it was decided that the next general assembly should be held in London in 1950. Publication of the organisation's quarterly journal, the *Revue Internationale du Trachome*, suspended in the war, is to be resumed shortly. Further information may be had from the president, Mr. A. F. MacCallan, F.R.C.S., Westminster Hospital Medical School, 17, Horseferry Road, London, S.W.1.

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London Medical Exhibition

This exhibition will be held at the Horticultural Hall, Vincent Square, London, S.W.1, from Nov. 17 to 21.

Return to Practice

The Central Medical War Committee announces that Dr. HAROLD PARSONS has resumed civilian practice at 25, Upper Wimpole Street, London, W.1 (Welbeck 9083).

Harveian Society of London

The late Sir Norman Gray Hill, who was killed in Sicily in 1944 while serving with the R.A.M.C., has left half the residue of his estate to this society.

Dr. G. S. W. Organe, consultant anæsthetist to Westminster Hospital, is making a three weeks' lecture tour of Italy on behalf of the British Council.

An expert committee set up by the Interim Commission of the World Health Organisation hopes to publish next year the first draft of an international pharmacopœia (*W.H.O. Chronicle*, 1947, **1**, 149).

The first number of a new quarterly, the *Journal of Clinical Pathology*, has appeared this month. Edited for the Association of Clinical Pathologists by Dr. A. Gordon Signy, the journal is published by the British Medical Association. The annual subscription is 25*s.*, and single numbers are obtainable for 7*s.* 6*d.*

Appointments

PHILPS, SEYMOUR, F.R.C.S.: asst. ophthalmic surgeon, St. Bartholomew's Hospital, London.
ROTH, MARTIN, M.D. Lond., M.R.C.P.: senior psychiatrist, Crichton Royal Mental Hospital, Dumfries.
SIGNY, A. G., M.B. Lond.: pathologist, group laboratory, St. Mary Abbots Hospital, Kensington.
STUART, R. D., D.SC., M.D. Aberd., D.P.H.: bacteriologist, Glasgow Royal Infirmary.
USBORNE, MARY, M.B. Lond., M.R.C.P., D.C.H.: house-physician, Hospital for Sick Children, Great Ormond Street, London.

The London Hospital:

AYOUB, J. E. M., B.M. Oxfd, F.R.C.S.: asst. ophthalmic surgeon.
CHALLIS, J. H. T., M.R.C.S., D.A.: senior anæsthetist.
FOX, G. P., M.A. Camb., M.R.C.S., D.A.: asst. anæsthetist.
LISTER, ARTHUR, M.B. Camb., F.R.C.S.: senior ophthalmic surgeon.

Births, Marriages, and Deaths

BIRTHS

CHAPMAN.—On Nov. 5, at Chipping Norton, the wife of Dr. John Chapman—a son.
CRAIG.—On Nov. 1, at York, the wife of Mr. A. J. Craig, F.R.C.S.—a son.
EMBLETON.—On Nov. 7, at Wokingham, the wife of Dr. J. J. A. Embleton—a son.
FOSTER-CARTER.—On Nov. 7, in London, the wife of Dr. A. F. Foster-Carter—a son.
HARTLEY.—On Nov. 6, at Loughborough, the wife of Dr. P. L. M. Hartley—a son.
MCGOWAN.—On Nov. 4, at Bristol, the wife of Dr. G. K. McGowan—a daughter.
MOIR.—On Nov. 4, at Woking, the wife of Dr. J. H. Moir—a son.
MOORE.—On Nov. 3, the wife of Dr. T. S. Moore—a son.
SIMMONS.—On Nov. 1, at Andover, the wife of Dr. A. B. Simmons—a daughter.
WICKES.—On Nov. 2, at Plaxtol, Kent, the wife of Dr. I. G. Wickes—a daughter.
WRIGHT.—On Nov. 2, the wife of Dr. H. B. Wright—a son.

MARRIAGES

CARTER—GRANTHAM.—On Nov. 1, in London, Frederick Stephen Carter, M.B., to Nym Grantham.
FINCH—FELDMAN.—On Nov. 4, in London, Bernard Finch, M.R.C.S., to Patricia Feldman.
FLANAGAN—PAYNE.—On Nov. 7, in London, Michael Brendan Flanagan, M.B., to Vera Doreen Payne.
VINCENT—VENTOR.—On Nov. 8, at Transkei, S. Africa, S. E. Vincent, M.R.C.S., to Joyce Ventor.
WOLFSON—ESCHELBACHER.—On Oct. 29, in London, Leslie Joseph Wolfson, M.B., to Nancy Eschelbacher.

DEATHS

BARNES.—On Nov. 1, at Colyton, Devon, Henry John Barnes, M.R.C.P.E., lieut.-colonel R.A.M.C. retd., aged 89.
ROBERTS.—On Nov. 7, at Folkestone, Hugh Treharne Llewellyn Roberts, M.A. Camb., L.R.C.P.E., barrister at law, aged 80.
STRICKLAND.—On Nov. 3, at St. Helier, Jersey, Cyril Strickland, M.A., M.D. Camb., aged 66.
WHITE.—On Nov. 9, John Richard White, L.R.C.P.E., aged 89.
WILLIAMS.—On Oct. 29, at Killiney, Herbert Armstrong Williams, D.S.O., lieut.-colonel I.M.S. retd., aged 72.

Diary of the Week

NOV. 16 TO 22

Monday, 17th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
6.15 P.M. Mr. Terence Cawthorne: Aural Vertigo.
ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
5 P.M. Mr. K. V. Bailey: Treatment of Prolapse in the Child-bearing Age.
HUNTERIAN SOCIETY
8.30 P.M. (Apothecaries' Hall, Black Friars Lane, E.C.4.) Dr. Franklin Bicknell, Dr. Kenneth McFadyean, Sir Jack Drummond, F.R.S., Mr. Magnus Pyke, PH.D.: That Our Present Diet is Undermining the Health of the Nation.

Tuesday, 18th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. E. R. Boland: Administration of Medicine. (First Croonian lecture.)
ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. J. C. Hogg: Non-malignant Strictures of the Œsophagus.
ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
5 P.M. Prof. R. J. Kellar: Toxæmia of Pregnancy.
SOCIETY OF APOTHECARIES, Black Friars Lane, E.C.4
5 P.M. Prof. B. W. Windeyer: Radiotherapy in Cancer of the Mouth.
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. M. Sydney Thomson: Parasitic Affections—Animal and Vegetable.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
2.15 P.M. Dr. E. H. R. Harries: Respiratory Tract in Infectious Diseases.
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Mr. G. C. L. Bertram, PH.D.: Eugenics, Population Trends, and the World's Resources.

Wednesday, 19th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. C. P. Wilson: Carcinoma of the Œsophagus.
ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
5 P.M. Mr. Charles Read: Choice of Treatment in Carcinoma of the Cervix.
SOCIETY OF APOTHECARIES
5 P.M. Dr. Eliot Slater: Physical Treatment in Mental Disease.
INSTITUTE OF DERMATOLOGY
5 P.M. Dr. C. W. McKenny: X-ray Technique.
ROYAL MICROSCOPICAL SOCIETY
5.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Prof. R. D. Passey, Dr. L. Dmochowski, Prof. W. T. Astbury, F.R.S., Dr. R. Reed: Electron Microscope Studies of Tissues from High- and Low-breast-cancer Strains of Mice.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Mr. L. Z. Cosin: Modern Methods in the Care of the Aged.
BRITISH PSYCHO-ANALYTICAL SOCIETY
8 P.M. (1, Wimpole Street, W.1.) Prof. C. H. Waddington, F.R.S.: Science and Belief. (Ernest Jones lecture.)
ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow
5 P.M. Prof. John Morley: Abdominal Pain as an Aid to Diagnosis in Abdominal Disease. (John Burns lecture.)

Thursday, 20th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. Boland: Administration of Medicine. (Second Croonian lecture.)
ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
5 P.M. Prof. H. L. Sheehan: Pathology of Obstetric Shock.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE
7.30 P.M. (London School of Hygiene, Keppel Street, W.C.1.) Laboratory demonstrations.
HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Mr. J. N. J. Hartley: Story of a Museum.

Friday, 21st

ROYAL COLLEGE OF SURGEONS
5 P.M. Dr. I. Harvey Flack: Lawson Tait. (Thomas Vicary lecture.)
6.15 P.M. Mr. J. Pennybacker: Brain Abscess in Relation to Diseases of the Ear, Nose, and Throat.
ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
5 P.M. Dr. Geoffrey Marshall: Pregnancy Associated with Pulmonary Tuberculosis.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. Prof. James Miller, Prof. Chassar Moir: Centenary of the Use of Anæsthesia in Obstetric Practice by J. Y. Simpson. Short communications.
8.30 P.M. *Radiology.* Prof. Elis Berven (Stockholm): Radiological Treatment of Malignant Tumours in Radium-hemmet.
SOCIETY OF APOTHECARIES
5 P.M. Prof. L. J. Witts: Diseases of the Blood.
FACULTY OF RADIOLOGISTS
2.15 P.M. (Royal College of Surgeons, Lincoln's Inn Fields, W.C.2.) *Therapy.* Professor Berven, Miss M. C. Tod, Dr. Frank Ellis: Carcinoma of the Vulva.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Mr. V. C. Thompson: Mediastinal Tumours.
LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. Prof. H. J. Seddon: A History of Scrofula.

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PATHOLOGY OF SUDDEN DEATH*

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THIS review of the more common pathology of sudden death is based on an analysis of my own medicolegal case-records of 15,000 necropsies, ranging from simple natural deaths to violent wilful killing, and covering all ages from birth to that of a man who claimed 108 years—a slight exaggeration into which he had been flattered by press attentions.

The proportion of deaths from natural causes was 68%, roughly two-thirds, a reminder of the vast amount of ordinary morbid anatomy passing through the hands of the forensic pathologist. Among these 15,000 natural deaths were 6267 (41%) in which death took place suddenly, if not instantaneously, on collapse, an unexpected event precipitating death within a few hours of apparently good health. This group I have extracted for study, and I make no apology for concentrating on the principal common disorders rather than the rarer if more diverting diseases. I have excluded the hazards of birth, such as atelectasis of the lung, and developmental defects which could not properly be included within the orbit of disease, for these are problems in other fields.

Cause of Death.—A personal factor must enter into the wording of the cause of death. Where, for instance, senility, hypertension, and coronary occlusion by atheroma exist together at death, as is common enough, it is reasonable to assume that all three have contributed to death. The heading used for such cases has depended on the relative contribution assessed for each disease, and in such a matter I have to ask you to trust to my evaluation, right or wrong. As age increases, its contribution to the decompensation of a heart which has held hypertension at bay for many years must gradually increase also; it must become increasingly reasonable to say that senility is the cause of such a death. However, this is a human whim, not measurable, which makes broader statistics of this kind unsuitable for mathematical niceties.

The field covered is indicated in the accompanying table. It is a striking feature of the complete table that, among the common natural causes of sudden death, the failings of the coronary or cerebral arteries alone account for more than 56%. These, unlike the failings of the aorta or of heart valves, rest on the ravages of disease or of what Clifford Allbutt has called the "qualities of tissues carried away by the stealthy hours" for which medicine has no known treatment—a sobering thought which might well stimulate new interest in the pathogenesis of arterial sclerosis.

ACUTE ADRENAL INSUFFICIENCY

Ten years ago, in an Erasmus Wilson lecture, I discussed the pathology of the fatal syndrome of acute adrenal insufficiency, finding examples of the diseases recognised to erase the functioning adrenal rapidly enough to cause death within a few hours (Simpson 1937). The most common is undoubtedly bilateral spontaneous hæmorrhage; and, whereas those hæmorrhages which occur after infancy are still recognised as being largely the result of meningococcal or streptococcal septicæmia (the former in cerebrospinal fever as the Waterhouse-Friderichsen syndrome), those which arise in the few days or weeks after birth have subsequently been recognised as commonly due to erythroblastosis fœtalis and not to the exaggerated hyperæmia of the androgenic zone in the postnatal period. Acute caseous tuberculosis and metastatic deposits of malignant growth comprise most of the remainder. Willis (1934) drew attention to the frequency of massive bilateral metastases in the suprarenal glands, especially from growths of the bronchus and breast. Many observers have confirmed his figure of some 9–10% for the frequency of adrenal involvement in all cases of metastatic cancer, and bilateral involvement is as common as unilateral.

RUPTURE OF AORTA WITHOUT ANEURYSM

Aortic rupture is as common without aneurysm as with it—indeed, increasingly more common—and the stimulus of Shennan's monograph (1934) has led to a more critical examination of many ruptures which might at first sight appear to result from the atheroma that is likely to be present (whatever the cause of rupture) after the age of 40.

Hyaline change—fatty atrophy of the medial muscle, mucinoid and hyaline degeneration of the connective tissue, and fragmentation of the elastin—is more common in men (65% males and 35% females in Shennan's original series), and, like all vascular ruptures, is aggravated by hypertension.

The ascending aorta gives way more often than any other part; in about four-fifths of my own 160 cases the burst took place between the aortic valve and the origin of the innominate artery. Hyaline degeneration was responsible for 60% of these.

The reporting of dissecting aneurysm has lagged behind that of rupture without aneurysm simply because though some degree of dissection is almost invariable—as a rule between the media and adventitia—it is usually short, being cut short by rupture into the pericardium. Nevertheless some remarkably long dissections have been recorded, and I have on many occasions traced the

ANALYSIS OF MORE COMMON NATURAL CAUSES OF SUDDEN DEATH

Cause of death	No. of cases	Pathological analysis
Abortion (natural) ..	10	
Acute adrenal insufficiency	15	
Allergic shock ..	4	
Aneurysm (aortic) rupture	143	Syphilis .. 80% Atheroma 20%
Aorta rupture (other than aneurysm)	160	Hyaline .. 60% Atheroma 30% Syphilis .. 10%
Asphyxia (natural causes)	140	(cf. unnatural causes .. 93)
Cerebral embolism ..	26	
„ hæmorrhage	806	Cerebral .. 75% Pontine .. 14% Cerebellar 11%
Subarachnoid hæmorrhage	268	Developmental aneurysms 78%
Cerebrospinal fever..	50	
Coronary embolism	10	
„ hypoplasia	11	
„ occlusion	638	Ostial occlusion (syph.) 7%
„ rupture ..	7	
„ thrombosis	988	
Heart: infarction ..	517	
„ : rupture ..	264	
„ : hypertensive failure	484	
„ : valvular disease	472	Rheumatic 79% Syphilitic 21% (Aort. sten. 36% Aort. insuf. 28% Mitr. sten. 20% Mitr. insuf. 4% Compound 12%)
Hæmoptysis (various causes)	36	
Hæmatemesis (various causes)	73	
Influenzal pneumonia	222	
Pneumothorax ..	9	
Pulmonary embolism	317	Recent injury 25%
Senility	577	

* A lecture delivered to the Royal College of Surgeons on July 29, 1947.

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course of a rupture which has begun in the aorta and proceeded as far as the upper thighs.

"Twin-bore" malformation of the aorta, with two intima-lined channels, is an interesting condition which illustrates the possibility of healing, and an example of healing of the primary split, included in the present series, has already been reported by Post (1941).

SUBARACHNOID HÆMORRHAGE

Far the commonest natural cause of subarachnoid hæmorrhage is rupture of a developmental aneurysm on the circle of Willis or infrequently on one of its cortical branches. Magee (1943) refers to Symonds's paper of 1924, in which attention was drawn to the frequency of the condition when seriously looked for, and reports the finding of 43 aneurysms in 58 necropsies for subarachnoid hæmorrhage, solitary in all but 5 cases, and on the front half of the circle of Willis as often as on the back half. In my own series 78% had such an origin. Nothing short of stereoscopic dissecting-glasses will provide adequate sight for some of the minute aneurysms. When no dilatation can be found, perfusion is the only sure method of locating the leak.

The use of the word "congenital" for such aneurysms is unfortunate, for they are not present at birth; it is the microscopic anatomy of the cerebral vessels whose development is responsible, and "developmental" is preferable.

Glynn (1940) and Carmichael (1946) have both drawn attention to the important defects of elastin in the internal lamina in the cerebral vessels as distinct from those in the media which occur almost as commonly in many other parts of the body. Of the other factors which contribute to rupture we cannot discount a rise in blood-pressure either in the form of hypertension or from exertion. Some cases in the present series have occurred during moments of maintained tension—e.g., a young garage hand lying under a car, tightening a nut with a spanner, suddenly cried "Oh my head" and collapsed unconscious. He was dead when a doctor arrived four or five minutes later.

A word of caution should be given on the interpretation of these aneurysms later in life. There may be deposits of fat and lipoids in their walls, and some degree of atheroma may, with increasing years, be developing in the circle of Willis. It must not be lightly assumed that saccular aneurysms in such company are of a different pathology; they are likely to be identical in origin. Atheroma of the cerebral vessels leads to a different form of dilatation, not saccular but bulbous, fusiform, and occurring along the course of affected vessels rather than from the stems of their branches.

CORONARY-ARTERY DISEASE

In coronary occlusion lies a cause, perhaps the only natural cause apart from senility, of *instantaneous* death. Coronary occlusion resulting from ostial syphilis, atheroma of the course of the vessel, or thrombosis in addition, rarely rupture, accounted for no less than 26% of the total of sudden deaths; and infarction or rupture, depending on coronary disease, for a further 12% of this series. It is remarkable that this disease should have come into proper recognition only as late as 1910 or 1912, mainly through Herrick and Mackenzie, for it undoubtedly existed in the time of the famous clinico-pathological observers of the 1820–60 period—Addison, Wilks, Bright, Gull, and Hodgkin, to mention only one group at a famous London hospital. In the Gordon museum of Guy's Hospital there were displayed specimens of "myomalacia cordis"—arising from coronary-artery disease no less than from softened infarcts. Rupture was also shown—an event which, except for trauma, I have not seen in nearly 20,000 necropsies unless through an infarct or infarct scar.

Since the sex-frequency and distribution of coronary thrombosis in a series of my own cases has already been reported (Simpson 1939), I shall deal here only with its immediate pathogenesis. Numerous observers, notably Winternitz et al. (1938) and Nelson (1942), have drawn attention to the frequency of subintimal hæmorrhage as a factor in the genesis of thrombosis; the key to the lesion is the vascularisation of the normally avascular intima. When atheroma develops, the new sinusoidal capillaries which develop with the disease are most liable to rupture. Rupture is likely during violent exercise or on direct trauma, and the diffusion of thromboplastic substances is a likely consequence of subintimal hæmorrhage, especially if the diseased intima is ruptured. Any interruption of the smooth flow of blood by obstruction of the lumen is naturally likely to foster the development of thrombi, especially during periods of rest or after collapse from any cause.

As regards trauma causing the development of thrombosis, this conception of the pathogenesis is of great importance. Warburg's (1938) review of 197 cases of non-penetrating injuries of the chest included some in which trauma was associated with coronary thrombosis in a manner which would satisfy searching criticism, though naturally it did not provide exact scientific proof. Stern (1945) describes similar cases whose pathogenesis has been equally critically tested.

ASPHYXIA IN INFANTS

The problem of causation in asphyxial deaths in infancy must be handled with the greatest care: its solution is largely a matter of technique. There is no doubt that bronchitis or bronchiolitis, a common cause of infant death, can develop in as short a time as 12–18 hours (Hubble and Osborn 1941), the child appearing normal when fed, placed in a cot or bed, and dying overnight from the accumulation in sleep of mucopus in the air passages. Thelin (1942), of Zurich, claimed that out of 30 cases he examined because the suddenness of death had precluded certification, or even raised suspicion, he could demonstrate blocking of the lumen by inflammatory secretions in 20. Unfortunately his criteria were not sufficiently critical. During any asphyxiation the lungs became congested and excess mucus, œdema fluid, and even blood will accumulate in the air passages. Only microscopy can detect whether pus also lies in this material. Worse, vomiting may complicate the issue, resulting from asphyxia and adding yet another fluid to that already in the air passages. It is at this point that a serious error commonly arises: the death is attributed to the inhalation of vomit, when in fact the vomit is no more than a reflexion of a state of asphyxia already present. Of Thelin's series of 30 cases 7 (23%) died of suffocation. It is likely that microscopy of the fluid in the air passages would have increased the proportion of cases ascribed to suffocation. In the 233 cases of asphyxia in infants extracted for this survey no less than 93 (40%) were the result of accidental suffocation. The application of more strict criteria virtually doubles the number, excluding as non-inflammatory many air-passage fluids that might incautiously be described from their naked-eye appearance as inflammatory.

Thelin also gave a flicker of life to one now virtually dead bogy, status lymphaticus, when he attributed death to this "state" in 3 of his 30 cases. The status lymphaticus is no more than a status, and if we admit, however unwillingly, the possibility (Campbell 1938) that such subjects may die more readily than others of some trivial cause, that does not excuse the failure to find that cause. We should be no more at liberty to say that a person died of flat-feet or a dwarf stature or some other status.

(*References at foot of next page*)

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THE INTRACELLULAR MODE OF ACTION OF THE SULPHONAMIDE DERIVATIVES

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FOLLOWING early observations by Colebrook and Kenny (1936), Colebrook et al. (1936), and Finklestone-Sayliss et al. (1937) that, in the conditions of in-vitro laboratory experiments, the sulphonamides are not immediately lethal to bacteria, Wolff and Julius (1939) showed that *p*-aminobenzenesulphonamide acts on bacteria only when they are multiplying.

From the growth curves presented by these authors it is apparent that active inhibition by sulphonamide only becomes manifest when the organisms enter the logarithmic phase of growth. Soon after this work appeared, the same conclusion was reached by two of us in these laboratories, as already recorded by O'Meara (1942). Hobby et al. (1942), Hobby and Dawson (1944), and Bigger (1944a and b) subsequently showed that penicillin acts best on rapidly growing bacteria, thus extending the original observation of Fleming (1929) that penicillin is lethal to staphylococci only when they are growing. There is, however, no reason to believe that the sulphonamides and penicillin act on the metabolism of micro-organisms in the same way.

The growth phases of bacteria in a culture may be recorded by counting the number of organisms per c.cm. of culture at intervals during growth and plotting the logarithms of the numbers so found against the corresponding time intervals. A "typical" result is shown in fig. 1; the logarithmic phase of growth appears as a straight line, since during this phase the organisms are increasing numerically in a geometrical progression. But, even at the height of the logarithmic phase not all the organisms in the culture are multiplying at the maximal rate. Thus Wilson (1922) has shown that some of them are dying, and Hirsch (1933) found that multiplication took place in spurts. It follows that some are out of step with the majority, either not having yet reached the logarithmic phase or having passed beyond it.

BACTERIA IN LOGARITHMIC PHASE OF GROWTH ARE SUSCEPTIBLE TO SULPHONAMIDES

That it is bacteria in the logarithmic phase of growth which are susceptible to sulphonamides is shown conclusively with logarithmic-phase cultures. These are prepared by subculturing the organisms, when they are at the height of the logarithmic phase of growth in an ordinary culture, into media so adjusted that growth in the subculture continues in the logarithmic phase without interruption. In these conditions the sulphonamides are immediately lethal to bacteria. A logarithmic-phase inoculum is introduced into a control medium and into the same medium with a suitable concentration of added sulphonamide derivative, and bacterial counts are made immediately and at intervals. Growth continues in the control in the logarithmic phase, whereas in the presence of the sulphonamide derivative the culture becomes sterile within an hour. We have used *Bact. coli* with urine as the culture medium and *Strep. pyogenes* with meat-extract-peptone broth to which were added 0·2% glucose and 0·1% sodium bicarbonate. Both the urine and the broth were sterilised by filtration. In all experiments the media were warmed to incubator temperature before inoculation. Bacterial counts were made by the usual cultural methods immediately after inoculation of the media, and at hourly intervals thereafter, for 8 hours as a rule, and finally at 24 hours.

In fig. 2 growth of *Bact. coli* in urine and in urine containing sulphapyridine 40 mg. per 100 c.cm. are compared. The inoculum is from an ordinary 24-hour culture which has passed the logarithmic phase. It will be seen that a 30-fold increase in numbers takes place in the presence of sulphapyridine before the compound begins to act. Sterility is only achieved somewhere between 8 and 24 hours after inoculation.

In fig. 3 the results of using a comparable inoculum of *Bact. coli* in the logarithmic phase of growth are shown. The growth of the control continues geometrically, whereas in the urine containing sulphapyridine sterility is established within an hour.

The corresponding results for *Strep. pyogenes* in the appropriate medium and in the same medium with sulphapyridine 20 mg. per 100 c.cm. added are shown in figs. 4 and 5.

To obtain results as perfect as those shown in figs. 3 and 5 it is necessary to determine exactly, by trial, the period of incubation which brings the preliminary culture to the height of the logarithmic phase. If the inoculum is withdrawn too early or too late, the number of organisms which have not reached the logarithmic phase, or which have passed it, is too great to permit a perfect result. It is also necessary to use a small inoculum of not more than about 100 organisms per c.cm.

Fig. 6 shows the result likely to be obtained if the inoculum is not fully in the logarithmic phase of growth. The same type of result is obtained by using too large an inoculum, even though it be taken from the height of the logarithmic phase.

IN SEPTICÆMIA BACTERIA ARE IN THE LOGARITHMIC PHASE

The technique of obtaining logarithmic growth from the moment of inoculation may be used to determine whether bacteria causing infection are growing in the logarithmic phase or not. Experimental pneumococcal septicæmia in the mouse lends itself to such investigation, since the organisms are present in the blood-stream of the animal in large numbers shortly before death. Blood is taken from the heart of such animals and is inoculated into the medium used for growing streptococci, or into a similar medium, with 5% added rabbit serum, the medium being warmed to 37°C before inoculation. Bacterial counts are done immediately and at intervals. It is difficult to judge the optimal period for withdrawal of the blood, but most successful cultures start to proliferate immediately without an initial stationary period. They are often not quite in the logarithmic phase though very near it. The results may be interpreted as showing that the great majority of the organisms are in the logarithmic phase, and allowance has to be made for the imperfections inevitable in an experiment of this kind.

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The type of result obtained is shown in fig. 7 in conjunction with a control for which the inoculum was derived from an 18-hour laboratory culture of the same organism as that causing septicæmia in the mouse.

NATURE OF THE CHANGES DURING LOGARITHMIC PHASE OF GROWTH

Bacteria in the logarithmic phase of growth are causing extremely rapid chemical and physical changes in their internal and external environment. They are engaged in fission of those materials in the medium most suited to providing both energy for growth and essential growth requirements. They are assimilating the products of fission, many of which are chemically highly reactive. The physical and chemical changes in bacterial cultures most nearly concerned with the speed of bacterial growth are those related to the sources from which energy for growth is derived. Most pathogenic bacteria utilise the fermentable substances in the media, particularly fermentable carbohydrate such as glucose, if it is present even in traces, as their chief source of energy in the early stages of growth. At the same time there is a fall in pH due to the production of acid, mainly lactic acid, from the sugar. The oxidation-reduction potential of the medium also falls, at first slowly but during the logarithmic phase of growth very rapidly. Hewitt (1936), among others, has studied the redox potentials of cultures of many pathogens. In general their behaviour is similar to that described though differing in detail and degree.

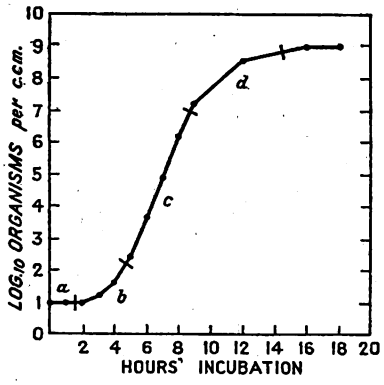

Fig. 1—A typical curve of bacterial growth: (*a*) initial stationary period; (*b*) lag phase; (*c*) logarithmic phase; (*d*) phase of negative growth acceleration.

As has been previously noted (O'Meara et al. 1944), the rapid development of reducing conditions in the medium must be due to the formation of a substance of great reducing intensity. A sulphydryl compound of the general formula R—SH suggests itself as an obvious possibility, but is ruled out by the fact that not all bacterial cultures which provide the reduction give a positive nitroprusside reaction, as they would be expected to do if sulphydryl were responsible. Another type of compound must therefore be sought; and, in view of its probable formation from carbohydrate, a dienol compound containing the group

$$-C=C-$$
$$\quad | \quad |$$
$$\quad OH \quad OH$$

suggests itself for consideration. The possible compounds of this type likely to be derived from glucose in bacterial cultures are ascorbic acid, glucoreductone, and dihydroxyacetone.

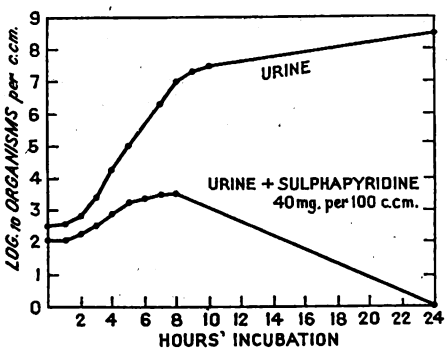

Fig. 2—Growth of *Bact. coli* in urine and in urine containing sulphapyridine. Ordinary inoculum.

PRODUCTION OF A DIENOL COMPOUND BY BACTERIA DURING GROWTH

The production of a dienol compound by the common pathogens during growth on ordinary laboratory media is readily shown by the test described by Fearon and Kawerau (1943). The organisms are inoculated heavily on to nutrient agar slopes and tested at intervals by washing the growth to the bottom of the slope with about 1 c.cm. of a saturated aqueous *o*-dinitrobenzene solution and then adding a drop of 20% caustic-soda solution. Table I shows that all the organisms tested gave a positive result for the production of a dienol compound, as shown by the development of a purple colour, the strongest results being obtained early in growth with such organisms as *Bact. coli*, *Bact. aerogenes*, and *Staph. aureus*, which grow vigorously in these circumstances.

Production of ascorbic acid in bacterial cultures has been shown by Büsing and Peters (1940), using *Chromobact. prodigiosum*. The dienol compound produced by the pathogens does not, however, appear to be ascorbic acid, since it repeatedly failed to give the dihydroascorbic-acid test of Fearon and Kawerau (1943), which is specific for ascorbic acid. The compound produced by bacteria is therefore either glucoreductone or dihydroxyacetone. Of these, the former is the more probable. When media of the type used in these experiments are heated for a few minutes in boiling water they will reduce methylene-blue. The pathogens inoculated into media so heated start to grow more readily than in unheated media. Hence it is probable that the reducing substance is available for immediate utilisation by the organisms. It has been shown by O'Meara (1937) that the concentration of the meat extract prepared freshly from meat decides the rate at which reduction will take place when the media are heated. There is good reason to believe that it is the free sugar content of the extract which determines its reducing power. Moreover, the media are alkaline, and it has been shown by von Euler and Klussmann (1933) and von Euler and Martius (1933) that glucoreductone is readily formed when a hexose such as glucose is heated with alkali. The media used in the experiments recorded in table I gave a positive *o*-dinitrobenzene test after they had been heated for some minutes in boiling water. Taking all these facts into consideration it is highly probable that the dienol compound formed by bacteria during growth is glucoreductone.

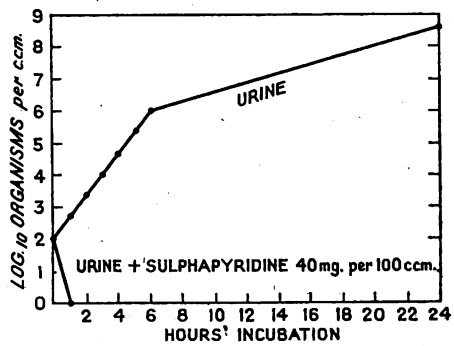

Fig. 3—Growth of *Bact. coli* in urine and in urine containing sulphapyridine. Logarithmic-phase inoculum.

CHEMICAL INTERACTIONS OF *p*-AMINOBENZOIC ACID AND SULPHONAMIDE DERIVATIVES WITH GLUCOREDUCTONE

Highly reactive aldehydic compounds, such as glucoreductone, $CH_2OH.CO.CHO$, form condensation products very readily with *p*-aminobenzene derivatives. Glucoreductone may be prepared in solution by methods such as the following modified from von Euler and Martius (1933):

20 c.cm. of 10% glucose solution is heated with 1 c.cm. of 20% caustic soda at 77°C for 10 min. The solution turns brown. After heating, 1 c.cm. of glacial acetic acid is added and the mixture is cooled.

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This solution may be used to prepare condensation products of reductone and the *p*-aminobenzene derivatives. Thus, by saturating the acid solution with *p*-aminobenzoic acid a yellow colour is produced, and a crop of yellow crystals soon begins to be deposited on the unaltered *p*-aminobenzoic acid at the bottom of the tube. The yellow crystals are repeatedly washed with acidulated water until free from *p*-aminobenzoic acid. These crystals are a compound of *p*-aminobenzoic acid and glucoreductone. They are insoluble in water, in which they give a fluorescent suspension, but go into solution with ease on the addition of a trace of alkali, to give a yellow solution in which the compound rapidly undergoes hydrolysis, even at room temperature, to give a colourless solution. After hydrolysis a positive *o*-dinitrobenzene test indicating the presence of reductone and a positive Ehrlich reaction indicating the presence of *p*-aminobenzoic acid are given by the solution.

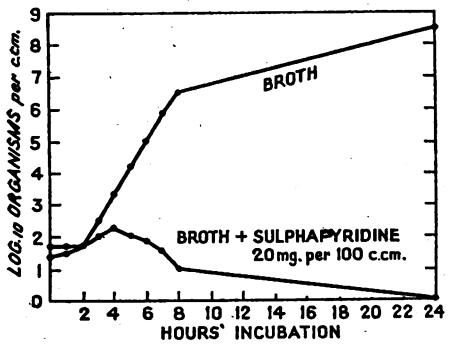

Fig. 4—Growth of *Strep. pyogenes* in broth and in broth containing sulphapyridine. Ordinary inoculum.

The sulphapyridine and sulphathiazole derivatives of reductone have also been isolated. The sulphanilamide reductone compound, owing to its solubility, has not been obtained free from sulphanilamide. Both ascorbic acid and dihydroxyacetone form yellow solutions with *p*-aminobenzoic acid and the sulphonamides. The condensation reactions are slow, and the products of condensation have not been isolated. In referring further to the compounds formed with reductone we shall use the contractions R-P.A.B. for that derived from *p*-aminobenzoic acid, and R-S.A., R-S.P., and R-S.T. for those derived from sulphanilamide, sulphapyridine, and sulphathiazole respectively. Some of their properties are summarised in table II.

The chemical characteristics of these compounds will be the subject of further investigation, but certain properties emerge from this study which correlate well with the observed biological behaviour of *p*-aminobenzoic acid and the sulphonamides (Stamp 1939, Green 1940, Woods 1940, Fildes 1940, Rubbo and Gillespie 1940, 1942).

The extreme ease with which reductone condenses with *p*-aminobenzoic acid to form R-P.A.B. and the ease with which this compound dissolves and undergoes hydrolysis within the biological range of pH suggest that the function of *p*-aminobenzoic acid in bacterial metabolism is to stabilise and temporarily to conserve for use of the cell the extremely active chemical substance glucoreductone formed by breakdown of carbohydrate. Glucoreductone is likely to be an essential source of energy for growth and of carbon for assimilation. It is, at the same time, likely to prove toxic to the cell, by reason of its chemical reactivity, if it is allowed to accumulate in the environment. Moreover, it will be lost by spontaneous oxidation unless stabilised. The oxidation takes place rapidly and is catalysed by copper, which was shown by O'Meara (1937) to have a deleterious effect on the reducing power of bacteriological media and on the maintenance of a low potential by bacteria.

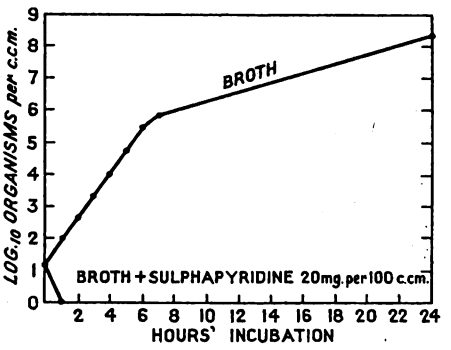

Fig. 5—Growth of *Strep. pyogenes* in broth and in broth containing sulphapyridine. Logarithmic-phase inoculum.

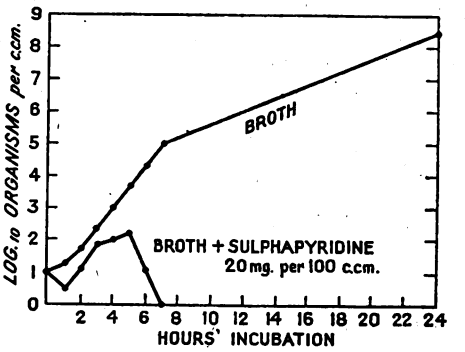

Fig. 6—Growth of *Strep. pyogenes* in broth and in broth containing sulphapyridine. Inoculum not quite in logarithmic phase.

In normal metabolism, therefore, bacteria utilising carbohydrate as a source of energy for growth probably form R-P.A.B. with the reductone which they produce. They then utilise the reductone as required, setting it free from R-P.A.B. Anything which interferes with the production of R-P.A.B. or destroys reductone or diverts it from normal utilisation by the bacteria will disorganise normal metabolism. The production and assimilation of reductone may be interfered with in several ways. By the addition to cultures of substances of similar chemical structure to *p*-aminobenzoic acid with an amino group in the para position, such as the sulphonamides, it is to be expected that reductone will be diverted to form condensation products unable to be used by the bacterial cell. Some compounds will be more active than others, and their activity may be expected to be related to the readiness with which they form derivatives with reductone and the firmness of their combination with reductone or their tendency to combine with reductone in a way different from that which leads to the formation of R-P.A.B. The three sulphonamide compounds which we have studied are, in ascending order of antibacterial activity, sulphanilamide, sulphapyridine, and sulphathiazole. With reductone sulphanilamide forms the least stable and most readily hydrolysable compound. The compound formed with sulphathiazole is most stable, the sulphapyridine compound being more stable than that with sulphanilamide and slightly less than that with sulphathiazole. These findings are in agreement with the antibacterial activity of the substances.

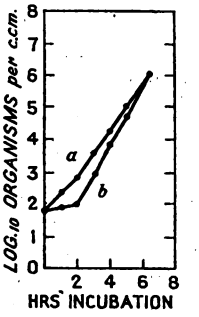

Fig. 7—Growth of pneumococcus: (*a*) inoculum from mouse septicæmia; (*b*) inoculum from ordinary 18-hr. culture.

It also follows that *p*-aminobenzoic acid should be able to inhibit the action of the sulphonamide derivatives. Its power of inhibition should be greatest with sulphanilamide, less with sulphapyridine, and least with sulphathiazole, in view of the stability of their reductone derivatives. This is also in accordance with the observed experimental facts of the inhibitory action of *p*-aminobenzoic acid on the sulphonamide derivatives (Medical Research Council 1945).

Another way in which the utilisation of reductone could be interfered with is by oxidation. In this connexion attention may be drawn to the finding of McLeod

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et al. (1944) that oxygen aids sulphonamide activity, as may be expected if the sulphonamides act in the way now suggested. Still another way in which the utilisation of reductone might be interfered with is by the addition of a catalyst with a well-marked accelerating effect on the oxidative destruction of reductone. Such a catalyst is copper, which inhibits the growth of small inocula of

TABLE I—*o*-DINITROBENZENE TEST APPLIED TO BACTERIAL CULTURES

Period of incubation (hours)	Organism					
	Bact. coli	*Bact. aerogenes*	*Staph. aureus*	*Strep. pyogenes*	*Strep. viridans*	Pneumococcus
2	++	++	±	−	−	±
4	++	++	+	+	±	±
6	++	+++	++	+	±	±
24	+	+	±	++	+	±
48	−	−	−	+	−	−

+++ and ++, immediate strong positive reaction.
+, immediate positive reaction.
±, positive reaction in 1–5 min.
−, negative reaction in 5 min.
Uninoculated control tubes gave no reaction in 5 min.

bacteria in ordinary laboratory media while permitting growth from large inocula (O'Meara and Macsween 1936, 1937). The sulphonamides give the same type of result as shown by Colebrook et al. (1936).

There is much collateral evidence, therefore, to support the view that reductone is important in bacterial metabolism, and that sulphonamide activity is attributable to interference with its utilisation by reason of a replacement of the normal *p*-aminobenzoic acid reductone reaction by a sulphonamide reductone reaction. Further, it can be shown that bacteria metabolise R-P.A.B. but do not metabolise R-S.P. and R-S.T. Moreover, bacteria during growth assimilate *p*-aminobenzoic acid and sulphonamides added to their environment.

UTILISATION OF R-P.A.B. BY *Strep. pyogenes*

To show that *Strep. pyogenes* can utilise R-P.A.B. a medium is required which, while being devoid of energy sources, contains all the other growth essentials for the organism. Such a medium is obtained by growing *Strep. pyogenes* repeatedly in meat-extract-peptone broth until the medium is exhausted of energy sources for growth. The organisms are finally removed by centrifuging, and the supernatant fluid, after adjustment to pH 7·4, is diluted to a third of its strength with sterile water or saline, placed in sterile tubes in 10 c.cm. lots, and sterilised by immersion in boiling water or by steaming. In this medium an inoculum of *Strep. pyogenes* shows a progressive decline in numbers, and after a few days a loopful on a nutrient agar slope gives no growth. On the other hand, good visible growth of the organism is obtained if 0·1% glucose is added to the medium before inoculation. R-P.A.B. is, from its chemical constitution, a much less effective source of energy than glucose. It was decided to add 2 mg. of R-P.A.B. to the culture tubes each day in carrying out tests for growth. About a fifth of the added R-P.A.B. is reductone. The necessary data are not available to enable the energy derived from conversion of reductone to lactic acid to be calculated. Assuming that the amount of energy liberated is equal to that from the same weight of glucose in a similar transformation to lactic acid, and allowing for loss of reductone by spontaneous oxidation, it may be calculated that the addition of 2 mg. of R-P.A.B. to 10 c.cm. of medium will be of similar value to the organism as the addition of 0·002% of glucose.

The amount of growth to be expected is consequently very small. It was followed by spreading a loopful of the culture over the surface of a nutrient agar slope every day during the experiment and counting the colonies which developed on subsequent incubation. The results (table III) show that in a few days the streptococci die out in the control and in the control with daily additions of 2 mg. of R-S.P. or R-S.T. On the other hand, growth of the expected order occurs in the tubes to which 2 mg. of R-P.A.B. is added every day. Addition of *p*-aminobenzoic acid gives no growth. Though the streptococci die out in the control tubes and in those to which R-S.P. and R-S.T. are added, it can be shown that not all the organisms are dead. Growth can be revived in all tubes by the addition of 2 mg. of R-P.A.B. daily. No revival of growth is obtained by addition of 2 mg. of *p*-aminobenzoic acid daily. Results of experiments are given in table IV. Four tubes were inoculated, and 2 mg. of R-S.P. was added daily to two of them, and 2 mg. of R-S.T. to the others for five days. On the sixth day daily additions of 2 mg. of R-P.A.B. or of *p*-aminobenzoic acid were begun. In each case, after some days had elapsed, growth was re-established in the tubes to which R-P.A.B. was added, but no growth took place in those to which additions of *p*-aminobenzoic acid were made.

From these experiments it is apparent that streptococci can utilise R-P.A.B. as a source of energy for growth. They cannot utilise *p*-aminobenzoic acid, R-S.P., or R-S.T.

ASSIMILATION OF *p*-AMINOBENZOIC ACID AND THE SULPHONAMIDES BY BACTERIA DURING GROWTH

Assimilation of *p*-aminobenzoic acid and sulphonamide derivatives by the bacterial cell during growth is to be expected if bacteria produce reductone and cause it to form a condensation product with *p*-aminobenzoic acid in normal metabolism.

Assimilation can be shown in media which favour the formation of reductone and do not interfere with the ready estimation of low concentrations of the *p*-aminobenzene derivatives. The concentration of the sulphonamide derivative added to the culture must be such as not to interfere seriously with growth—e.g., 1/20,000.

TABLE II—SOME PROPERTIES OF THE REDUCTONE *p*-AMINOBENZENE DERIVATIVES

Properties	R-P.A.B.	R-S.A.	R-S.P.	R-S.T.
Approximate pH at which crystals appear	4	3–4	3	2–3
Colour	Yellow	Impure	Red	Orange
Solubility in water	Insoluble	Soluble	Insoluble	Insoluble
Addition of acid..	Deeper yellow	Soluble	Bright yellow	Bright yellow
Addition of alkali	Dissolve	Dissolve	Dissolve	Dissolve
Rate of alkaline hydrolysis of 1 mg.:				
in 10 c.cm. at pH 8, 37°C	2 hr.	?	3 hr.	>4 hr.
in 10 c.cm. at pH 10, 20°C	2 hr.	?	2 hr.	>4 hr.
Ehrlich's aldehyde reagent added to aqueous suspension	No reaction	Impure	No reaction	No reaction
Ditto after hydrolysis	+	Impure	+	+
o-dinitrobenzene test	+	+	+	+
Reduction of methylene-blue in faintly alkaline solution	+	+	+	+
Hydrazone formation (with phenylhydrazine and sodium acetate)	+	None	None	None

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The percentage of *p*-aminobenzene derivative located intracellularly at different stages of growth is determined by centrifuging a small volume of the culture at intervals and comparing the concentration in the supernatant fluid of the culture colorimetrically with the concentration in an identical uninoculated control, after the addition of Ehrlich's reagent to each. The percentage of *p*-aminobenzene derivative remaining in solution is thus obtained, and, by difference, the percentage combined in the bacterial cells. In table v are given the percentages of the various compounds located intracellularly at different periods of growth for *Bact. aerogenes*, a non-indol-producing *Bact. coli*, and *Strep. pyogenes*. The gram-negative organisms were grown in Koser's medium with 2% added glucose. The streptococcus was grown in glucose broth buffered with sodium bicarbonate.

The results show a fair degree of relationship to those in table I. Thus, maximal production of reductone takes place early in the growth of *Bact. aerogenes*, and it is at this time there is maximal uptake of *p*-aminobenzoic acid. With *Strep. pyogenes* maximal production of reductone falls later, and similarly the uptake of *p*-aminobenzoic acid is later than with *Bact. aerogenes*. In general

TABLE III—GROWTH OF *Strep. pyogenes* WITH R-P.A.B. AND LACK OF GROWTH WITH R-S.P. AND R-S.T.

Incubation period at 37°C (days)	No. of colonies developing on subculture of a loopful			
	Control	Control + R-P.A.B.	Control + R-S.P.	Control + R-S.T.
2	60	50	10	6
4	6	40	4	0
7	1	100	0	0
8	0	>100	0	0

there is a tendency for the bacteria to assimilate the sulphonamides less readily than *p*-aminobenzoic acid and, once they have been assimilated, to retain them in the cells longer.

SUMMARY AND CONCLUSIONS

The sulphonamide derivatives act on bacteria by affecting the metabolism of their logarithmic phase of growth. Bacteria causing septicæmia are in the logarithmic phase.

In this phase bacterial metabolism is at its height, and many highly reactive metabolites are produced in the cell and its environment. One such metabolite is a dienol compound, probably glucoreductone, which is unstable and highly reactive but unites readily with *p*-aminobenzoic acid to form a compound which is stable and non-reactive. This compound undergoes hydrolysis readily, liberating glucoreductone and *p*-aminobenzoic acid.

It is therefore suggested that *p*-aminobenzoic acid is a stabilising agent for glucoreductone in bacterial metabolism. It enables the cell to store glucoreductone as it is formed and to utilise it as required. It thus prevents the loss of an essential intermediate metabolite during growth and safeguards the cell from the toxic effects of so reactive a substance.

Glucoreductone may represent only one type of metabolite stabilised in this way, since other reactive substances, particularly other aldehydes and ketones, would be capable of condensing similarly with *p*-aminobenzoic acid.

That glucoreductone is important for growth of bacteria has been shown by finding that the compound formed by glucoreductone *p*-aminobenzoic-acid condensation is capable of being utilised by streptococci as a source of energy for growth.

TABLE IV—EFFECT OF R-P.A.B. AND *p*-AMINOBENZOIC ACID IN REVIVING GROWTH

Incubation period at 37°C (days)	No. of colonies developing on subculture of a loopful			
	R-S.P.		R-S.T.	
	A	B	A	B
1	100	100	100	100
4	0	0	0	0
*6	0	0	0	0
7	0	0	0	0
8	0	0	100	0
9	100	0	>100	0

* 2 mg. of R-P.A.B. added daily to tubes A; 2 mg. of *p*-aminobenzoic acid added daily to tubes B.

The sulphonamides condense almost as readily as *p*-aminobenzoic acid with glucoreductone. The condensation products with sulphapyridine and sulphathiazole are less soluble and less readily hydrolysed than that with *p*-aminobenzoic acid. The condensation product with sulphanilamide is more soluble. The chemotherapeutic activity of the sulphonamides and their susceptibility to the inhibitory action of *p*-aminobenzoic acid run parallel with the stability of the compounds which they form with glucoreductone. The condensation products of glucoreductone with sulphapyridine or with sulphathiazole cannot be utilised by streptococci as a source of energy for growth.

It is therefore contended that the sulphonamides act within the bacterial cell during active metabolism, such as is encountered during growth, by replacing *p*-aminobenzoic acid and combining with glucoreductone (and possibly other reactive metabolites) and preventing it from becoming available for the use of the cell. Such a deprivation during active growth is likely to be fatal, because the entire metabolism of the cell will be suddenly arrested at the point when it has become adjusted for the special purpose of reproduction. In support of

TABLE V—ASSIMILATION OF *p*-AMINOBENZENE DERIVATIVES BY BACTERIA DURING GROWTH

Compound	Percentage of added compound located intracellularly at different stages of growth			
	6 hr.	24 hr.	48 hr.	72 hr.
	Bact. aerogenes			
p-aminobenzoic acid	57	17	4	—
Sulphanilamide ..	12	29	35	—
Sulphapyridine ..	5	23	70	—
Sulphathiazole ..	29	23	33	—
	Bact. coli			
p-aminobenzoic acid	17	17	13	0
Sulphanilamide ..	3	25	31	23
Sulphapyridine ..	5	9	35	14
Sulphathiazole ..	5	25	25	14
	Strep. pyogenes			
p-aminobenzoic acid	17	67	44	35
Sulphanilamide ..	17	19	67	35
Sulphapyridine ..	0	17	44	5
Sulphathiazole ..	17	9	45	20

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this view it is shown that growing bacteria assimilate *p*-aminobenzoic acid and sulphonamides added to their environment.

This view of the mode of intracellular action of the sulphonamide derivatives is compatible both with their known relationship to *p*-aminobenzoic acid and the observations which show that their activity is enhanced by oxygen.

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STAPHYLOCOCCAL PNEUMONIA IN CHILDHOOD

PATHOLOGICAL CONSIDERATIONS

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PRIMARY staphylococcal pneumonia ranks among the gravest forms of staphylococcal infection in childhood. It occurs in epidemic and sporadic forms; but, though both forms appear to have been recognised more often in recent years, neither is common.

We have observed 55 necropsy cases of staphylococcal pneumonia in children, all under the age of 7 years, two-thirds of them being less than 6 months old, at the Royal Hospital for Sick Children, Glasgow. In addition one of us (K. J. G.) investigated in a maternity nursery an outbreak of staphylococcal infection which included 16 cases of pneumonia. Together these cases form a larger series than any of which we have knowledge, and for this reason and because penicillin is now generally available it seems timely to direct attention to the pathology of staphylococcal pneumonia.

Epidemic Form.—Epidemic staphylococcal pneumonia is often associated with an outbreak of virus influenza, which predisposes to secondary invasion by pyogenic organisms.

Fraenkel (1904) was apparently the first to isolate the staphylococcus in pure culture from the lung and pleura of a pneumonia patient. Habbe (1929) found staphylococcus as a secondary invader more often in influenzal than in other types of pneumonia. Chickering and Park (1919), Tytler et al. (1919), and Patrick (1919) record staphylococcal pneumonia after clinical influenza in young soldiers. Wollenman and Finland (1943) described necropsy findings in 8 older people.

In young infants staphylococcal pneumonia may also be met with in epidemic form apart from influenza or other virus infection, as in the nursery outbreak reported by Smith (1935). Cohen (1938) remarks on "the wave-like incidence of staphylococcus pulmonary infection and its propensity for infants in particular."

Sporadic Form.—Staphylococcal primary pneumonia in its sporadic form appears to be predominantly a children's disease, and according to Macgregor (Scottish Scientific Advisory Committee 1947) it is commoner in the neonatal period than at any other time of life.

Lyon (1922), on bacteriological examination of sputum, lung puncture, blood, and empyema fluid during life, found *Staph. aureus* to be the causal agent in 3 out of 31 cases of bronchopneumonia in infants and children. From necropsy material Menten et al. (1932) isolated *Staph. aureus* in 11 of 131 cases of pneumonia in children. Out of 6 cases Reimann (1933) had 1 in an infant, and another single case is quoted by Cass (1940) in a paper on staphylococcal infections in the newborn. Macgregor (1936) described 10 sporadic cases of staphylococcal pneumonia in children, and Kanof et al. (1939) had 37 cases in children, but of these only 25 were primary. Gaspar (1941) examined post mortem 144 cases of pneumonia, in 38 of which staphylococcus was the predominant or only organism. Of these, 20 were under one year of age and 8 between the second and tenth years. Clemens and Weens (1942) had 6 examples in early infancy.

Staphylococcal empyema, since it often complicates staphylococcal pneumonia, is also essentially a lesion of the younger age-groups.

Kanof et al. (1939) found it in their infantile cases so often that they considered it to be an integral part rather than a complication of the disease. Cohen (1938) attributes this to the smaller bulk of lung tissue between the pleura and the bronchi in children's lungs than is the case in adults. In their series of 33 children, Ladd and Swan (1943) showed that the incidence of staphylococcal empyema was greatest in the first year and indeed in the first three months of life. They regarded age as the most important factor in prognosis, with a sharp dividing line at the age of four months; of 12 patients below this age 8 died, whereas there was only 1 death in patients older than four months.

HOSPITAL CASES

Pathology

The 55 hospital cases consisted of 45 in which pulmonary consolidation was the outstanding feature and 10 in which the pneumonia was associated with suppurative bronchitis and bronchiolitis; in 2 it was accompanied by acute bronchiectasis, and in 3 by pulmonary abscess.

The consolidation varied from a dark red hæmorrhagic pneumonia, simulating lobar pneumonia both in appearance and distribution, to a diffuse grey pneumonia with suppurative softening which sometimes amounted to a localised abscess. The simple hæmorrhagic lobar-like pneumonia was present in 10 cases, and in all of them the duration of illness had not exceeded two days. When the illness had lasted longer it was common to find early suppurative change in a lobe which had obviously been wholly hæmorrhagic at the onset, while red consolidation, clearly more recent, bordered the suppurative areas or affected adjacent parts of other lobes. Fibrinous pleurisy was present in 16, and empyema in 26, of our cases. As a rule the empyema was unilateral and had produced partial collapse of lung; pyopneumothorax was present only in 1 case. Though the empyema pus was usually thick and yellow, some-

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times it was watery and brownish-red. In contradistinction to its frequency in pyæmic staphylococcal pneumonias, purulent pericarditis occurred only twice in the series; no metastatic abscesses were found in other organs.

Microscopically the appearance of the lungs varied in accordance with the macroscopic findings. Where the condition on inspection was mainly hæmorrhagic consolidation, microscopical examination showed groups of alveoli packed with red blood-cells as in an infarction. The consolidation was not, however, so confluent as the naked-eye appearance had suggested, and the alveoli at the margins of the hæmorrhagic areas were often filled with eosinophilic fibrin-free œdema fluid containing solitary alveolar phagocytes and small groups of gram-positive cocci. Nor was this spreading œdema limited to the hæmorrhagic pneumonias; it could be seen sometimes at the periphery of well-established areas of suppuration or in otherwise healthy contiguous lung.

After a virulent staphylococcal infection had lasted several days, the microscopical appearances were complex. There were numerous abscesses, some in relation to bronchi and often with well-defined pyogenic membranes and clumps of staphylococci. These suppurative foci were separated by consolidated hæmorrhagic or œdematous lung. Where pus existed in the smaller air channels, there was usually a well-established bronchitis and bronchiolitis, with extensive cellular infiltration and destruction of the bronchiolar walls, amounting in some cases to acute bronchiectasis. Nevertheless the bronchial walls often remained intact even to the ciliated epithelium, despite pus in the lumen.

Bacteriology

Staph. aureus was isolated at necropsy from all cases in the R.H.S.C. series; in a few instances the organism had also been obtained during life from pleural pus and throat and nasal swabs. The positive necropsy cultures totalled 119. Single specimens were examined in 24 cases, and two, three, and four specimens from the remainder. Pus—e.g., from pleura, lung abscess, and bronchus—was cultured; where there was no obvious pus, cultures were made by puncturing consolidated areas of lung after searing the pleural surface. A few nasal swabs were cultured post mortem and these mostly yielded *Staph. aureus*. This organism was isolated from both cases of pericarditis.

From the great majority of specimens cultured the staphylococcus was pure. Sometimes, however, material obtained by lung puncture or from bronchial exudate showed a combined staphylococcal and coliform flora (direct films gave valuable information about the nature of the infection), and for this reason we often used potassium tellurite in a dilution of 1/100,000 to suppress coliform contaminants (Medical Research Council 1940).

Most of the strains of *Staph. aureus* from sporadic and epidemic cases were deeply pigmented and non-hæmolytic on fresh blood-agar plates. In earlier cases coagulase tests were not performed, but with these exceptions all other strains were strongly coagulase-positive; those tested for penicillin sensitivity were usually inhibited to about the same degree as the Oxford standard staphylococcus. Specific phages for typing were not available to us.

SICK NURSERY OUTBREAK

One of us (K. J. G.) had personal experience of a small epidemic of staphylococcal infection in the sick nursery of a maternity hospital, where a series of neonatal deaths, chiefly among small premature infants, occurred in the winter of 1943–44 while mild clinical influenza was present among the mothers and the nurses. The infants affected were as a rule healthy at birth. After a few days of normal progress they suddenly collapsed, quickly became dehydrated and cyanosed, and died within 24–48 hours, without localising symptoms.

Bacteriological and Necropsy Findings

Material for bacteriological examination was obtained before death from some infants and from the whole 44 coming to necropsy. Since the clinical findings gave no clue to the nature of the disease, and since infections in premature infants are often atypical, a fairly comprehensive bacteriological investigation was necessary. Throat and nasal swabs and lung punctures were cultured on routine media to exclude the common respiratory pathogens, and mice were inoculated for pneumococci. Rectal swabs were examined, but no intestinal pathogen was isolated. Blood and spleen cultures were taken to exclude septicæmia. Pneumococci and hæmolytic streptococci were rarely recovered, and *Staph. aureus* was the only pathogen which recurred constantly throughout the investigation, having been isolated from 27 of 31 throat swabs, 40 of 54 lung punctures, and from almost half the 50 combined blood and spleen cultures.

Prof. C. H. Browning kindly performed mouse-virulence tests on several strains from the nursery outbreak; these were only moderately lethal to mice.

At necropsy lesions were confined to the respiratory tract. Of the 44 babies examined, 24 showed only slight hypostatic congestion of the lungs, sometimes with a few petechial hæmorrhages or patchy atelectasis. Pneumonia was present in 16, being localised in 4 and diffuse in 12. Of the 12 diffuse pneumonias 6 were hæmorrhagic and 1 had also multiple abscesses; the remaining 5 were ordinary non-suppurative bronchopneumonias. Multiple small lung abscesses without obvious pneumonic consolidation were present in the other 4 cases.

A more or less heavy growth of *Staph. aureus* was obtained from 10 of the 12 diffusely consolidated lungs, and from 3 of the cases with lung abscesses only. In some instances *Staph. aureus* was isolated also from other sources, such as throat swabs or blood or spleen cultures. No case showed empyema or fibrinous pleurisy; the bronchial tree throughout the series was free from inflammatory change and exudate.

Microscopically the pneumonic lungs showed areas of hæmorrhagic and of suppurative pneumonia with purulent bronchitis and bronchiolitis. Though there was considerable confluence of the pneumonic areas, the condition had clearly begun as bronchopneumonia. Acute vesicular emphysema separated the consolidated portions of lung. A feature of these neonatal lungs was the presence in the alveoli of large clumps of gram-positive cocci. Many of the infected alveoli had merely intense capillary congestion without inflammatory cellular infiltration or exudate, but suppuration with masses of cocci was the rule in the bronchi.

Source of Infection

It is impossible to say whether the staphylococcus alone was responsible for this epidemic, or whether it was associated with a mild type of virus influenza. An attempt was made, however, to trace the source of the staphylococci. No increased antecedent or concurrent incidence of staphylococcal infection, such as mastitis, was reported among the mothers, and the normal infants were free from pemphigus and other staphylococcal manifestations. Attention was then directed to the nurses, from whom multiple throat and nasal swabs were cultured. Of a total of 75 swabs 12 were positive for staphylococci, a figure which compares favourably with others reported in mass investigations of throat and nasal swabs in adults. Thus Gillespie et al. (1939) recorded a nasal carrier-rate of 33·4% in 159 students, and Miles et al. (1944) found relatively large numbers of staphylococci in the nares of 40–50% of over 1000 normal adults.

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To exclude milk as a vehicle of infection, prepared feeds were examined and they were found to be sterile. An exogenous source of infection thus appeared improbable, and the staphylococcal lung lesions were evidently endogenous, due to a downward spread of organisms present in the upper respiratory tract. Most of these infants were nasal carriers of staphylococci, and it is well known that feeble premature children are ill adapted to combat such infection.

DISCUSSION

In this children's hospital the bacteriology of respiratory disease has always received considerable attention, and we have found that the incidence of staphylococcal pneumonia has increased within recent years. This view is endorsed by Cohen in America. Similarly, Bracken (1941) noted a sharp rise in the percentage of staphylococcal pneumonia in adults in the last of the five-year periods he investigated in Pittsburgh. In Edinburgh also, Macgregor (1936), who recorded 10 cases of staphylococcal pneumonia in children within a year, remarked that the occurrence of so many sporadic cases in so short a time possibly indicated a phase of increased staphylococcal virulence.

Since small children swallow sputum, it is not available for bacteriological examination, and the incidence of staphylococcal pneumonia during life is difficult to assess. For this reason most of the published records are based on necropsy findings or on the culture of empyema fluid.

On comparing the necropsy records of this hospital in 1926–35 with those of the following decade, it is noted that, of 2300 consecutive necropsies in 1926–35, primary pulmonary staphylococcal infection was diagnosed in 3 cases only, whereas of 2877 consecutive necropsies in 1936–45, it was diagnosed in 55 cases. In both decades the proportion of necropsies to deaths has been more or less uniform, and thus there is a factual basis for the view that staphylococcal pneumonia has recently increased in this hospital.

Analysis of the bacteriologically investigated empyemata, of which we have complete records since 1928, yields supporting evidence. Care has been taken to exclude empyemata arising in the course of a staphylococcal pyæmia. Blacklock and Guthrie (1933) found that, of 46 fatal cases in which empyema complicated the pneumonia, 41 were pneumococcal, 4 streptococcal, and only 1 staphylococcal. Of 219 empyemata in 1931–45, all occurring in the course of respiratory infections, 10·5% were due to *Staph. aureus* alone. Like other workers (Riley 1944), we have noted in this hospital that, since the routine use of sulphonamides in pneumonia, the number of empyemata due to sulphonamide-sensitive organisms has diminished; on the other hand, there has been an increase, both relative and absolute, in staphylococcal empyemata.

We wish to emphasise the rapidly fatal character of the disease, whether sporadic or epidemic, in young children. Among our hospital cases the whole duration of illness in one child of 15 months was thirty hours; three children of 4 weeks, 1 year, and 4 years died thirty-six hours after onset; and six had an illness lasting not longer than two days. These children had apparently been previously healthy, and it was usually severe dyspnœa which first attracted attention, or sometimes the onset was accompanied by rigor, cough, and vomiting. In the nursery epidemic, affecting weakly and premature infants, sudden collapse was the most arresting feature, and death often occurred too quickly for localising signs to develop. The report on neonatal deaths due to infection (Scottish Scientific Advisory Committee 1947) emphasises that in maternity hospitals infection among infants, especially in the premature group, may appear and run its course without being recognised either as a cause of sickness or death or as an unwitting source of spread, because of the highly elusive signs and symptoms.

Some writers regard the child's age as the factor which determines the type of lung lesion. Gaspar (1941), in his series of 28 cases (20 of them under a year old), found that the staphylococcal pneumonias seen in the first ten days of life appeared as lobular or lobar consolidations, dark red and hæmorrhagic on section. The similarity between early staphylococcal pneumonia and pneumococcal pneumonia in the stage of red hepatisation is emphasised also by Smith (1935) and Genninger (1943). Ladd and Swan (1943) contrasted the exudative hæmorrhagic reaction frequent in infancy with the staphylococcal abscesses which they saw more often in older children. Analysis of our material has shown that the pulmonary lesion was related not to the age of the child so much as to the duration of the illness, since infants only a few days old sometimes lived a week or more after the onset and came to necropsy with suppurative lung lesions. Hæmorrhagic pneumonia, then, was in our experience the characteristic finding in staphylococcal pulmonary infections of short duration, and it was often associated with spreading alveolar œdema.

Hæmorrhagic pneumonia with œdema is likewise the earliest acute pulmonary lesion of human virus influenza, and it is also an experimental finding. McCordock and Muckenfuss (1933) found, in rabbits given intratracheal injections of vaccine virus, that the earliest gross change was an exudative lesion consisting of œdema with coagulated albuminous fluid and flakes of fibrin in the alveoli. Alveolar hæmorrhage with focal necrosis developed rapidly in the most acute cases where strong virus was used. True lobar and lobular pneumonia could not be induced by injection of virus alone, but were produced together with bronchial and peribronchial abscesses when pyogenic cocci were introduced with the virus. This suppurative process developed more slowly and thus corresponded to the lung lesions which we saw in staphylococcal pneumonia of longer duration.

The bacteriological findings support the view that acute staphylococcal pneumonia in children is a true bronchogenic infection, either endogenous or exogenous, probably the former as a rule, though only in 3 of our hospital series was there a definite history of an antecedent nasal discharge. This is a surprisingly small number, but in the nursery epidemic *Staph. aureus* was isolated on direct plating from nasopharyngeal swabs of about 90% of sick babies, whereas in a control series of 50 healthy premature infants nearly 65% were positive. Smith (1935) also found a high nasal staphylococcal carrier-rate among infants of a maternity hospital in which a staphylococcal epidemic had broken out. Cruickshank (1946) refers to the high incidence (80–100%) of nasal carriers of *Staph. aureus* in the first few weeks of life, and thinks that the nose is the reservoir from which endogenous infection spreads, since "the newborn infant is ill adapted to cope with bacterial invasion." In 6 of our cases, however, the staphylococcal pneumonia appeared to be a hospital (exogenous) infection. These children were all infants under six months of age, 5 having been admitted to hospital because of failure to thrive or of continuous vomiting, and 1 because of coliform pyuria. On admission no evidence of respiratory disease could be detected, and the infants seemed to improve for some days, when a sudden rise in temperature heralded the onset of pneumonia. Death took place within a few days, and necropsy revealed extensive pulmonary consolidation.

In view of the pronounced sensitivity to penicillin of most strains of *Staph. aureus*, it appears that in such urgent cases penicillin would offer the best chance of controlling the infection. Our observations on the

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pathology and bacteriology of staphylococcal pneumonia in children show that even in the earliest stages there is an extensive loss of aerating lung surface, so that penicillin, if it is to be effective, must be given early and in adequate dosage.

Diagnosis, particularly in the sporadic cases, is difficult. Considerable experience has convinced us of the uncertainty of lung puncture and the unreliability of throat swabs in the bacteriological diagnosis of pneumonia in childhood; and to await the results of bacteriological examination is to lose valuable time. In our opinion there is a prima-facie case for the exhibition of penicillin, with or without sulphonamides, empirically in all grave pneumonias in childhood, or when sudden dyspnœa or rise in temperature complicates a postnasal or upper respiratory infection in infants. Diagnostic difficulties are less in the epidemic form of the disease—for example, in maternity nurseries—and under these conditions penicillin may be used prophylactically.

The feasibility of administering penicillin by mouth has simplified its use in childhood. Buchanan (1946), working in this hospital, found that 4000 units of penicillin per lb. of expected body-weight daily, given in feeds to children under six months of age, yielded blood-penicillin levels comparable with those obtained with three-hourly injections of similar amounts. There is no objection to increasing this dose, and the 10,000-unit tablets manufactured by Burroughs Wellcome & Co. dissolve readily in feeds and are convenient in use. Further work has shown that these results can be obtained with certainty only in premature children and in infants in the first month of life, and though up to the age of six months most children absorb penicillin by mouth there is a proportion, increasing with age, which do not. Therefore in children over the age of a month it is prudent in grave illness to give three-hourly injections of penicillin in a dosage of not less than 4000 or 5000 units per lb. of body-weight daily. Older children tolerate the continuous intramuscular drip reasonably well.

The rapid spread of pulmonary œdema in acute cases suggests that oxygen should not be omitted from the therapy, and the delay in establishing bacteriological diagnosis is an argument in favour of combining penicillin with sulphonamides. A further reason for this combined treatment is the tendency for penicillin-insensitive organisms to appear during the course of penicillin therapy. Coliform replacement was known to occur in war wounds infected originally with staphylococci (Thomson 1944), and we have met with a pure coliform flora at necropsy, both in films and in cultures from multiple specimens, in bacteriologically proved staphylococcal pneumonias treated with penicillin.

A typical alteration in flora was seen in a male infant aged 4 weeks who developed bronchopneumonia with much cyanosis and dyspnœa and from whose sputum *Staph. aureus* was isolated on Feb. 28, 1946.

Penicillin by mouth, in a dosage of 9000 units six times a day, was begun on that day and was continued for ten days without improvement. Sulphadiazine was then given in an initial dose of 0·5 g. followed by 0·25 g. four-hourly. On March 11 thick muco-pus aspirated from the pharynx gave a pure coliform growth, insensitive to penicillin.

The child died that night, and at necropsy both lungs showed diffuse consolidation, with early suppurative softening and pus-filled bronchioles. A film of lung-puncture material showed coliform bacilli, and culture of this and of bronchial pus produced a pure coliform growth of ordinary fæcal type.

Such replacement has been recorded by Southwell (1946) during the treatment of bronchiectasis with inhaled penicillin, where after the elimination of penicillin-sensitive organisms from the sputum a luxuriant growth of coliform bacilli developed. It must be noted, however, that pneumonia in the neonatal period may be due solely to coliform bacilli (Macgregor 1947), which is another reason for combining penicillin with sulphonamides.

SUMMARY

Staphylococcal pneumonia appears to be becoming more common.

A grave disease with a high mortality, particularly in infants, this infection occurs both in sporadic and epidemic forms, and in epidemics is often secondary to virus infection, particularly influenza.

Pathological changes in children vary according to the duration of the disease. The earliest stage is a hæmorrhagic exudative reaction simulating the red hepatisation of lobar pneumonia, and this is particularly likely to be found in infants.

Premature babies have a poor resistance to the staphylococcus, and in lung infection death may take place with minimal pulmonary reaction, though the lungs contain abundant cocci.

The early exhibition of penicillin in adequate dosage combined with sulphonamides is recommended.

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THE CHRONIC PARETIC

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ATTENTION has often been drawn to the large proportion of patients with general paresis who, after artificial fever treatment, survive as chronic inmates of a mental hospital. Thus Lomholt (1944) wrote: "The malarial treatment has created a category of patients which was not known before, namely the defect-cured or stationary paralytics who fill our asylums in great numbers and are a burden to their families and to society." An early survey by Meagher (1929) of the results of malaria therapy suggested that about a third of the treated patients became chronic hospital inmates. Jossmann (1931), in a survey of 2200 patients, found 25% retained in hospital after treatment, and Moore et al. (1943) a somewhat higher proportion.

Few accounts of the condition of such patients with arrested or slowly progressive paralysis have, however, appeared. The extensive report by Lomholt on a series of Danish cases is an exception. It is therefore considered justifiable to present a summary of the condition of 42 such patients in Friern Hospital (see table).

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CONDITION OF CHRONIC PARETICS BEFORE AND AFTER TREATMENT

Case no.	Age on admission (yr.)	Date of admission	Before treatment						Treatment				After treatment (1942)						
			Blood W.R., yr.,§ and result	Cerebrospinal fluid				Clinical findings	Malaria‡		Arsenic		Colloidal sulphur	Blood W.R.	Cerebrospinal fluid				Mental state	Working capacity
				Yr.§	Protein (mg. per 100 c.cm.)	Cells per c.mm.	W.R.	Lange							Protein (mg. per 100 c.cm.)	Cells per c.mm.	W.R.	Lange		
									Yr.§	No. of rigors	Drug	Total dose (g.)	No. of injections							
1	51	1930	+30+	..	++	+	+15+	5555443210	Gr, dem, GPI	2	5	T	12	2	+30+	20	Nor	+2	Nor	Dem	None
2	42	1936	+30+	..	..*	40	+	5554321100	Dem, GPI	..	6	T	12	..	+10	20	,,	−	,,	Par, dem	,,
3	30	1930	+30+	..	++	++	+30+	5555542100	,,	..	12	..	..	11	+30+	30	,,	+6	,,	Gr, dem	Good
4	51	1938	+30+	..	70	++	+30	5555544321	,,	..	..	T	6	..	+15	20	,,	−	,,	Slight dem	None
5	31	1921	..	1	++	+	+40+	..	,,	3	12	NK	2·7	..	+6	20	,,	−	,,	Dem, sch	,,
6	30	1931	6+30	6	90	++	+30+	5555543210	Dem, TP	6	10	T	12	..	+30	20	,,	+2	3322100000	Slight dem	Some
7	54	1934	+30+	..	+	+	+6	5554432100	Gr, dem, GPI	..	12	T	12	12	+	20	,,	−	Nor	Gr	None
8	53	1939	..	..	125	+++	+30+	5555554321	Dem	..	..	T	22	..	+30+	40	,,	+2	2221100000	Dem	Some
9	41	1923	2+30+	2	++	++	+40+	..	Dep, dem, TP	2	12	NK	2·7	15	+7·5	20	,,	−	Nor	Childish	Good
10	38	1928	+40	..	++	+	+++	5555543210	Gr, dem, TP	..	12	NK	2·7	12	−	20	,,	−	,,	Gr, dem	Some
11	42	1924	..	..	+++	++	+40	..	Gr, dem, GPI	..	12	NK	2·7	13	−	20	,,	−	,,	Dem, sch	None
12	57	1932	+30+	..	..	..	..	..	,,	..	6	..	..	6	−	30	,,	−	,,	Gr, dem	Good
13	47	1924	6 −	..	..	..	..	..	Dem, GPI	1	12	NK	2·7	4	−	30	,,	−	,,	Sch	None
14	36	1930	+30+	..	++	++	+15.	5555543210	Par, dem	..	12	NK	2·1	12	+6	20	,,	−	,,	Dem	Good
15	48	1923	7 −	1	++	++	+40+	..	Gr, dem, GPI	1	12	NK	2·7	..	−	25	,,	,,	,,	Gr, dem	None
16	29	1924	10+30+	10	+	++	+15	5544321100	Gr, GPI	10	12	T	12	..	+6	Lumbar puncture refused				,,	,,
17	32	1936	++++	..	75*	25	++++	5555555321	Par, dem, TP	..	9	T	12	..	−	,,	,,	,,	,,	,,	,,
18	32	1919	7+20+	3	Nor	Nor	−	..	Par, hem	..	..	..	..	..	−	20†	Nor	−	Nor	No gross dem	Good
19	31	1925	+40+	..	++	++	+40+	..	Dem	2	12	NK NAB	2·7 1·8	..	−	20†	,,	−	,,	,,	,,
20	62	1929	+40+	..	++	Nor	+40+	5555555321	Dem, GPI	..	12	NK T	2·7 25·5	14	−	Lumbar puncture refused				,,	,,
21	25	1912	13+40+	13	+†	+	+4	..	Par	13	8	NK	2·7	12	−	30	Nor	−	Nor	,,	,,
22	32	1917	15+30+	8	++	++	..	5555432100	Par, GPI	9	10	NK T	2·7 12	..	−	20	,,	−	,,	Dem	Some
23	47	1932	+30+	..	++	++	+30	5555432100	Gr, dem, GPI	..	10	T	12	..	−	20	,,	−	,,	No gross dem	Good
24	31	1915	7 −	7	..	..	−	..	Gr, confused	..	..	..	..	..	−	Lumbar puncture refused				,,	,,
25	50	1934	++	..	50*	++	+30	5555554321	Gr, dem	..	12	T	12	..	+30+	20	Nor	−	Nor	Gr	Some
26	50	1925	+40+	..	..	..	+40+	..	Dem	1	12	NK	2·7	..	+10	40	,,	−	,,	Euphoric, dem	Good
27	39	1934	+30+	..	+	+	+15	5555543210	Gr, dem, GPI	..	12	T	24	7	+30	+	Red cells	−	,,	Destructive, dem	None
28	39	1929	+++	..	130*	196	++	5555544322	Dem, GPI	..	10	T	+	..	+6	20	Nor	−	,,	No gross dem	Good
29	36	1923	+40	..	++	+	+40	..	Gr, dem, GPI	..	6	NK	2·7	4	−	30	,,	−	,,	Euphoric, dem	,,
30	37	1930	+30+	..	++	+++	+30+	5555543210	Dem, GPI	..	12	NK	1·05	12	+30+	60	4	+30+	5433210000	Dem	Some
31	43	1931	+30+	..	++	++	+15	5555443210	Sch, dem, GPI	..	8	T	12	..	+30+	20	Nor	−	Nor	,,	Good
32	50	1931	+30+	..	+	+	+30+	5555443210	Gr, dem, TP	..	10	T	12	..	+30+	20	,,	−	,,	Euphoric	,,
33	35	1933	+30+	..	+++	18	++	4333333310	Gr, dem, GPI	1	12	T	12	8	+30+	60	,,	−	0011221100	Dem	,,
34	49	1931	+30+	..	..	..	..	..	Dem, GPI	..	12	..	..	..	+30+	70	40	+15	4433221000	Gr	None
35	32	1935	+30+	1	+	..	+15	4432110000	Manic	1	12	T	24	11	+30+	50	Nor	+15	2221110000	Dem, sch	,,
36	42	1928	+40+	..	++	+	+40+	5555543210	Gr, dem, GPI	..	12	NK NAB	2·7 1·25	..	+6	35	,,	−	Nor	,,	,,
37	14	1927	+40+	..	+	+	+8	5554432100	Dem, GPI	..	..	..	..	..	+30+	20	,,	−	,,	Dem	Some
38	46	1931	+30+	..	+	+	+30+	5555543210	Gr, dem, TP	1	8	T	4	9	+30+	20	,,	−	,,	No gross dem	,,
39	43	1931	+30	..	..	..	..	..	Gr, dem, GPI	..	11	T	20	5	+30	20	,,	−	,,	Gr, dem	None
40	46	1936	+30+	..	+	+	+6	0012321000	Par, dep	..	10	T	12	..	+30+	20	,,	−	,,	Dem	Some
41	35	1923	+	1	++	++	+40+	..	Dep	2	12	NK	2·7	..	+	30	,,	−	,,	,,	Good
42	31	1937	+30+	..	70	++	+30+	5555543100	Gr, dem, GPI	..	12	T	12	..	+30+	25	,,	−	,,	Dem, sch	None

* Excess globulin present. † No excess globulin. ‡ Benign tertian strain was used in all cases except nos. 2, 3, 5, 15, 27, 28, and 42, where there is no record of the strain. § No. of years after admission, where not same year, is shown in italics.
NAB, 'Novarsenobillon'; NK, 'Neokharsivan'; T, 'Tryparsamide'; Nor, normal; GPI, general paralysis of the insane; TP, taboparesis; hem, hemiplegia; gr, grandiose; dem, demented; dep, depressed; par, paranoid; sch, schizophrenic.
For explanation of numerical results of Wassermann reaction (W.R.) see Mann and Partner (1936).

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It might be thought that, with the reduced incidence of syphilis and the more extensive use of penicillin, the results of fever therapy in general paresis would become of little practical interest. However, the late war brought a steep increase in the number of fresh cases of syphilis, and the early reports on the use of penicillin in neurosyphilis are disappointing, probably because the blood-brain barrier presents a formidable obstacle to therapy (Neymann et al. 1945). So for some time to come the results of artificial fever treatment are likely to be of interest to the psychiatrist and syphilologist.

MATERIAL

The 42 patients were all inpatients in Friern Hospital. The average period which had elapsed after treatment was 11½ years, the range 6–18 years. In most cases the cerebrospinal fluid (C.S.F.) was normal or almost so, but 7 C.S.F. Wassermann reactions showed a slight change. Four colloidal-gold curves started with figures of 2 or 3, one with 4, and in case 30 twelve years after treatment, a patient who could still do a little work in the hospital, there was a typically paretic curve with a very strongly positive C.S.F. Wassermann test. In 25 cases the blood Wassermann reaction was positive.

As regards the mental picture, 12 patients were grandiose and demented, 13 had simple dementia, 3 were grandiose without gross dementia, 2 were depressed, 4 were schizophrenic, and 8, though kept in hospital, did not appear grossly deteriorated. The number classified as schizophrenic and paranoid before treatment was 7, and 6 after treatment, which supports Lomholt's view that the incidence of the so-called Gerstmann psychosis—i.e., schizophrenia developing as a result of malaria therapy—is rare.

Of the 42 patients 17 were good workers, 9 were fair workers, 15 did no work, and 1 was destructive. A good many of them displayed an almost pathological appetite for manual work, such as scrubbing, sweeping, cleaning, and scouring. They were expansive cheerful indefatigable workers who would gladly work an extraordinary number of hours without reward. Fixation at this nearly hypomanic level is common in the treated cases of general paresis.

DISCUSSION

Lomholt's picture of mental hospitals with a dense population of paretics, their disease arrested by malaria, is somewhat overdrawn. Despite the tendency for such cases to accumulate with the years, they still form in London but a small group compared with the great accumulation of cases of chronic schizophrenia which in England is a far more serious social problem.

The earlier estimates (Jones 1926, Lilly and Hopkins 1927), which attributed 10% of admissions to mental hospitals to syphilis, are either inaccurate or refer to a period when the incidence of syphilis was higher (Hilliard and Kirman 1941). From my personal observations on admissions to London observation wards in 1940–42, less than 2% are due to syphilis. In some countries where syphilis is more common than in Britain —Simpson (1935) reported 500,000 fresh cases yearly in U.S.A.—the problem may be more serious, but it is difficult to understand how in a country like Denmark, where fresh cases of syphilis before the late war had reached the phenomenally low level of 400 a year, the mental hospitals can be choked with paretics. In fact, chronic paretics in England occupy only a small proportion of the total accommodation, and some of them appreciably more than earn their keep.

It has been seriously suggested to me that fever therapy should be withheld from the more obviously demented paretics since, even at the best, after treatment they would merely be a burden on the community for years to come. This attitude seems indefensible, because (1) even the most experienced clinician may underestimate the degree of recovery which is possible, and (2) it is clear that the size of the burden thus imposed on the community has been grossly overrated.

It remains true, however, as Nicol and Hutton (1944) showed, that general paralysis is eminently curable, and that the best results are obtained in the treatment of relations of patients with positive C.S.F. but no clinical signs. Each chronic paretic represents a lost opportunity of early diagnosis and cure. It is to be hoped that, with the general recognition by syphilologists of the need for surveillance of the C.S.F., the results of fever therapy will become increasingly favourable and the chronic paretic correspondingly rare.

SUMMARY

A series of 42 cases of chronic paresis who have remained in Friern Hospital for 6–18 years is reviewed.

The average period after treatment was 11½ years.

Of the 42 patients 24 were doing some work in hospital, and some were very good workers, though in 25 cases the blood Wassermann reaction was still positive, and in 7 the C.S.F. Wassermann reaction still showed slight changes.

Chronic paretics do not represent a heavy burden on the community and should become much fewer with the routine use of lumbar puncture by venereologists, followed where necessary by prophylactic fever treatment or suitable chemotherapy.

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TRANSPLANTATION OF TERES MAJOR AND LATISSIMUS DORSI

FOR LOSS OF EXTERNAL ROTATION AT SHOULDER

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THE teres major muscle does not seem to have been used often for transplantation, though Boppe (1944) substituted it for a paralysed serratus anticus. In 1934 L'Episcopo described six cases of obstetrical palsy in which he had transplanted the insertion of teres major from the front to the back of the humerus. The paralysis of the external rotators was complicated by an adduction and internal-rotation contracture, and the tendon transference had to be preceded by division of all the contracted tendons on the front of the joint, as described by Fairbank (1913) and Sever (1925). L'Episcopo could not find any previous reference to this tendon transplantation.

The operation described here differs in some respects from that suggested by L'Episcopo, and it may have important applications in the reconstructive surgery of the many brachial-plexus lesions sustained in the war.

L'Episcopo placed the patient prone, with the arm abducted, and his incision was parallel to the lower border

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of the deltoid and to the long head of the triceps. The teres major was approached on the medial side of the triceps, which needed strong retraction laterally to expose the shaft of the humerus. If the first part of the operation is undertaken with the arm behind the patient's back—i.e., in adduction and full internal rotation—the muscle is easily exposed between the long and lateral heads of the triceps, as in Henry's (1945) approach to the back of the humerus. L'Episcopo attached the transplanted tendon to the bone just medial to the lateral head of the triceps, an insertion which does not give a good mechanical advantage. By passing the transplant through a longitudinal slit in the origin of the lateral head of the triceps, it can be inserted on the lateral aspect of the humerus if the arm is externally rotated but not abducted.

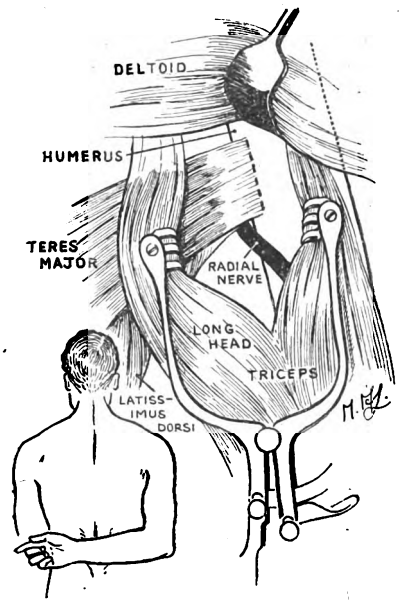

Fig. 1—Retraction of deltoid upwards and separation of long and lateral heads of triceps to expose teres major.

The other feature in which this operation differs from that of L'Episcopo is that both the latissimus dorsi and the teres major are transplanted.

CASE-RECORD

A man, aged 30, had been wounded by a shell splinter in the right side of the neck and below the angle of the right scapula on Jan. 23, 1944. The wound in the chest had caused a hæmothorax, but healing had been satisfactory except for some involvement of the latissimus dorsi in the scar. The neck wound had been complicated by a partial brachial-plexus paralysis affecting C5 and C6. The patient was admitted to the Wingfield-Morris Orthopædic Hospital on June 21, 1944, under the care of Prof. H. J. Seddon. The plexus was explored on July 19, and was found to be in continuity; later considerable recovery took place, chiefly in the deltoid and biceps.

On Oct. 8, 1946—nearly three years after the injury—the deltoid and biceps were working against gravity and weak resistance, but the external rotators of the humerus showed no more than a flicker of voluntary power. The patient's chief disability was the tendency of the arm to swing towards the chest when he lifted anything in the right hand. He was a gardener, so the inconvenience was considerable, and he was anxious to have any operation that might improve function.

Operation (Oct. 9, 1946).—With the patient prone and the arm in full internal rotation, the insertion of the teres major was exposed by a reversed S incision over the back of the upper third of the arm, the posterior border of deltoid being retracted upwards, and the long and lateral heads of the triceps separated (fig. 1). The radial nerve was identified at the lower border of the teres major, and, after a dissector had been introduced in front of the insertion of the muscle, the tendon was detached from the humerus. The latissimus dorsi was so intimately blended with the teres major at its lower margin that both muscles were taken together. A confusing anatomical anomaly was a belly of muscle running parallel to the upper part of the teres major but on a posterior plane. This muscle was inserted on the posteromedial aspect of the humerus medial to the uppermost fibres of origin of the lateral head of the triceps. The arm was externally rotated as much as possible, and the tendinous insertions of the teres major and latissimus dorsi were passed through a slit in the upper part of the lateral head of the triceps (fig. 2). They then ran deep to a longitudinal periosteal band about 1 cm. wide and were finally fixed to the posterolateral aspect of the humerus with a mattress suture passed through drill holes.

After closure of the wound the arm was fixed in external rotation with a strut passing from a plaster belt to a long arm plaster.

After-treatment.—This position was maintained for five weeks, and after the first three weeks voluntary and faradic exercises were performed without abducting or internally rotating the humerus.

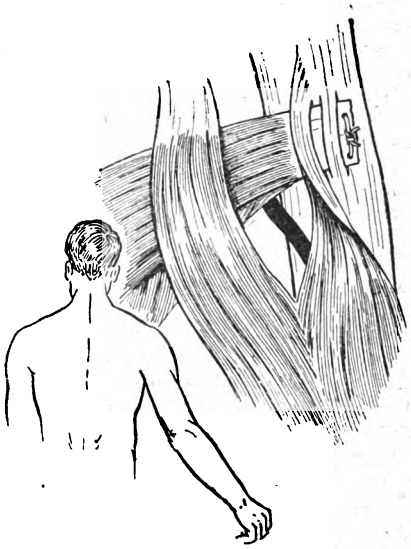

Fig. 2—Detached tendon of teres major and latissimus dorsi passed through slits in lateral head of triceps and periosteum, and sutured to humerus.

Progress.—On Nov. 14 the plaster was removed; the patient could flex the shoulder and elbow without the forearm swinging inwards towards the abdomen and could put the hand to his mouth with ease. By Dec. 16 the function of the transplant had improved considerably; there was no tendency to internal rotation of the arm when the elbow was flexed, and the patient could actively externally rotate the humerus from a position of full internal rotation to about 15° of external rotation. He was delighted with the result and was convinced that it made the arm more useful.

COMMENT

A high proportion of brachial-plexus injuries affect the upper roots or trunk of the plexus, and in such palsies recovery is seldom so good in the external rotators as in the deltoid and elbow flexors. Thus a permanent paralysis or weakness of external rotation is a common sequel of this injury, with the result that the patient cannot lift any object without the forearm swinging in towards the trunk, a disability which is aggravated if the external rotators are subjected to greater stress by abducting the arm.

SUMMARY

Transplantation of the teres major and latissimus dorsi to the outer side of the humerus is suggested to restore external rotation of the arm in certain injuries of the brachial plexus.

The operation is a modification of that described by L'Episcopo and makes use of Henry's approach to the back of the humerus.

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Preliminary Communication

IMMUNISATION OF THE MAMMALIAN EMBRYO

IT is generally accepted that young mammals initially derive all their antibodies from the mother, though these are ultimately replaced by other antibodies formed by the gradual development of active immunisation. Some species obtain their maternal antibodies mainly through the placenta before birth, whereas other species —e.g., calves, lambs, kids, foals, and pigs—obtain all their antibodies through the colostrum after birth (Needham 1931, Marrack 1946, Rimington and Bickford 1947, McGirr 1947). Antibodies secreted in the colostrum, the titre of which equals or even exceeds that of the maternal serum (Mason et al. 1930), pass rapidly through the wall of the gut into the circulation of the newborn, with the result that the titre of their serum may equal or exceed that of the mother a few hours after the first feed.

In man, the rabbit, and the guineapig, which species obtain their maternal antibodies mainly through the placenta before birth, the young may acquire further antibodies through the colostrum after birth. Both homologous and heterologous antibodies can pass the placental barrier in these species. The current view is that these antibodies pass through the allantochorionic placenta, and that its permeability depends on the number of tissues intervening between the maternal and fœtal blood-streams. Thus in the ungulates, in which the greatest number of tissues intervene between the maternal and fœtal circulations, the placenta is impermeable to antibodies, whereas in anthropoids and rodents, in which none of the intervening maternal tissues persists and even the fœtal tissues may be reduced, the placenta is permeable to antibodies.

The histological identification of a clot of fibrin in the yolk-sac cavity of many 8-, 9-, and 10-day embryos of wild rabbits, though this is probably an abnormality, led to the demonstration that fibrinogen, which clots in oxalated solution in the presence of thrombin, is a normal component of the yolk-sac fluid of the embryos of tame rabbits (Brambell and Mills 1946, 1947). It has since been shown by electrophoresis and the ultracentrifuge that albumin, α, β, and γ globulins, and fibrinogen are all present in the yolk-sac fluid in similar proportions to each other as in the maternal plasma. The presence of these plasma-proteins in the yolk-sac fluid of 7- and 8-day embryos, before the development of the embryonic vascular system, indicates that they are probably derived from the mother. Further evidence of this is the fact that Evans blue, injected into the maternal circulation, becomes selectively attached to the albumin fraction and passes into the yolk-sac fluid (Brambell Hemmings, Kekwick, and McCarthy, not yet published).

The presence of globulins in the yolk-sac fluid and their known immunological significance suggested that antibodies might pass from the maternal circulation into the embryo through the bilaminar omphalopleur of the yolk-sac wall. We have shown that agglutinin for *Brucella abortus*, whether actively or passively acquired, passes freely from the maternal circulation into the yolk-sac cavities of rabbit embryos on the 7th and 8th days post coitum, before the formation of the allantochorionic placenta. The passage into the yolk-sac in a few hours of the agglutinin passively acquired by the mother, inoculated with immune serum, precludes the possibility of its formation in the embryo.

Agglutinin passes from the mother into the embryo also at later stages of gestation, after the 15th day post coitum, by which time the allantochorionic placenta is fully established and the yolk-sac cavity has been opened up to the uterine lumen by the disappearance of the bilaminar omphalopleur. It has not been possible to determine so far whether this passage at later stages of embryonic development is via the allantochorionic placenta or via the exposed yolk-sac splanchnopleur or both.

The bearing of these results on the current theory of placental permeability is obvious, since it is clear that agglutinins can, and do, pass into the rabbit embryo by a route other than the allantochorionic placenta. Evidently the passage of agglutinin through the embryonic membranes does not depend on the proximity of the maternal and fœtal circulations. Moreover there does not appear to be any morphological reason why the yolk-sac should not provide a possible route into the embryo for maternal globulins in other rodents also; but this is not true for man, in which it is precluded by complete isolation of the yolk-sac wall from the chorion by the exocoele. Some character of the embryonic membranes common to man and the rodents, other than hæmochorial placentation, may explain their similarity in permeability to antibodies.

This work forms part of a scheme of research on prenatal mortality financed by a grant from the Agricultural Research Council to one of us (F. W. R. B.).

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Reviews of Books

A Way of Life for the Handicapped Child

EIRENE COLLIS, M.L.S.P., M.A.O.T. Foreword by SOMERVILLE HASTINGS, F.R.C.S. Introduction by WINTHROP M. PHELPS, M.D., F.A.C.S. London: Faber and Faber. 1947. Pp. 183. 10*s.* 6*d.*

THE title of this book is somewhat misleading, since it deals only with children handicapped by cerebral palsy, and not with those handicapped by other conditions such as rheumatic heart disease or poliomyelitis. It is a technical treatise, designed to enable the doctor, therapist, or teacher to understand the handicaps and how they may be overcome; and within these limits it is extremely valuable, though not easy reading. The arguments, and some of the sentences in which they are developed, demand close attention if they are to be understood, while some of the author's assumptions are of doubtful validity. Nor is the list of references complete, accurate, or well arranged; but these blemishes are inconsiderable when compared with the implicit evidence of wide reading, keen observation, and hard thought.

Mrs. Collis is a follower, in this field, of Prof. W. M. Phelps, of Baltimore, who has written the introduction to her book. Her practice differs from his chiefly in her reliance on physical education, while Phelps makes much additional use of splinting and of drugs. She recently indicated in these columns the ideas on which her treatment is based,[1] and she explains and expands them in this book. She deals with the attitude of the parents and the important part played by fear, love, and rage in the child, and she analyses the motor defects and their immediate causes and considers the associated sensory defects. Mental defect receives rather less attention than it deserves; in the past all sufferers from cerebral palsy were likely to be dubbed mentally defective and ineducable, while nowadays

1. *Lancet*, Aug. 16, pp. 239, 248.

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there is a tendency to say that, apart from a few exceptions, they are all mentally normal. Neither statement fits the facts, though the modern view offers better safeguards for the child; certainly many intelligent children have missed both treatment and education because they were wrongly labelled mentally defective. One way of judging fitness for treatment is to try it for three months or even longer. Research on intelligence tests for these children is urgently needed.

Re-education is discussed in principle and in detail, and the parts played by physiotherapists and occupational and speech therapists are outlined. Rule-of-thumb treatment is useless; the therapists need to be highly intelligent well-trained people with analytical minds and human sympathies. The section on school work gives only meagre information, but there are useful lists and drawings of equipment, and descriptions of exercises and the methods of physical examination.

Although Mrs. Collis writes: "The book . . . has no bearing whatever on the politics, ethics, or administration of new cerebral-palsy schemes," she has been unable to resist a sketch of how the present organisation might be remoulded nearer to her heart's desire. She has wisely not tried to deal with the practical difficulties and complications. Her book will interest therapist, pædiatrician, neurologist, and orthopædic surgeon, but the practical politics of bettering our lamentable facilities for the treatment of cerebral palsy must be worked out in committee.

Diseases of Metabolism

(2nd ed.) GARFIELD G. DUNCAN, M.D., clinical professor of medicine, Jefferson Medical College, Philadelphia. London and Philadelphia: W. B. Saunders. 1947. Pp. 1045. 60*s*.

THE first edition of this book appeared in 1942 and represented the work of some fifteen contributors. The same authors are largely responsible for the new edition but are joined by six others. The chapters on disorders of thyroid metabolism and on diseases of the kidney are new and good, and though the book as a whole is very much as it was, some of the chapters have been largely rewritten. C. N. H. Long, for instance, has inserted a great deal of new matter into the chapter on carbohydrate metabolism, and this part now contains a clear summary of the biological systems of oxidising enzymes and the importance of the organic phosphates with high energy bonds. The preface notes that the disturbances in nutrition seen during and after the war have "further crystallized medical thinking in terms of total calories, protein, vitamins, minerals and fluid balance." Yet the new chapter on undernutrition, though somewhat longer than the old, will seem dull and academic to anyone who has had any experience of the real thing during the last five years; and the chapter on vitamins contains no mention of the obscure but interesting syndromes which emerged as clinical entities from the prison camps in the Far East. The chapter on mineral metabolism is little changed. The section on iodine, however, has been omitted and appears in expanded form in the new chapter by Winkler on thyroid diseases. Some will not accept all the statements about serum iodine, for those not at New Haven have found it difficult to make satisfactory determinations of iodine in serum; but present ideas about the treatment of thyrotoxicosis are clearly reviewed.

Preventive Medicine and Public Health

WILSON G. SMILLIE, M.D., professor of public health, Cornell University, New York. London: Macmillan. 1947. Pp. 607. 30*s*.

Dr. Smillie defines preventive medicine as "those activities that are the direct responsibility of the individual," falling "for the most part upon the family health advisor." It is time that this distinction was made between public health—the old State medicine—which is the function of communities and in which the family doctor does not take an active part, and the prevention of diseases and preservation of the health of individuals, which are his province entirely. Dr. Smillie has little to say about communal hygiene, which is roughly synonymous with sanitation, but deals at length with the more technical medical service of guarding people from diseases. Broadly, this is the approach to clinical medicine through epidemiology, using that term in the wide sense which is now general. Though Dr. Smillie's approach tends to be from the pathological rather than the physiological angle—being concerned with the prevention of diseases rather than the maintenance and furtherance of health—this is none the less a most serviceable book. Since health and disease have no boundaries, it will be useful to British as well as to American doctors, though British students will recognise differences in practice on the two sides of the Atlantic. Being intended for students and for those in active medical practice, its statements are dogmatic; little is said of subjects about which professional epidemiologists are still speculating. The book is fully up to date in most particulars, though there is no reference to the action of rubella in pregnancy producing developmental errors in the embryo, and we miss a chapter on genetics. In the next edition Dr. Smillie might well mention the British control of rabies, for this is the only example of a disease being exterminated by action designed for that purpose.

Bone and Bones—Fundamentals of Bone Biology

JOSEPH P. WEINMANN, M.D., College of Dentistry, University of Illinois; HARRY SICHER, M.D., School of Dentistry, Loyola University, Chicago. London: H. Kimpton. 1947. Pp. 464. 50*s*.

OSTEOPHILES, whether clinicians, pathologists, anatomists, or physiologists, have long been looking for an authoritative book on their subject, and this one goes a fair way towards satisfying them. The authors are a pathologist and an anatomist, and their dual viewpoints thus cover the normal and disordered morphology and morphogenesis of osseous tissue, bones, and teeth. The chapter on osseous tissue is in some ways the most disappointing section: so much is left unsaid. There is scant mention of the intracellular substance, its character and formation (for all that it is the real skeleton from which bone is built), and nothing about the work on X-ray analysis and polarised light which has been so well reviewed by Dallemagne in the series of French monographs, *Actualités Biochimiques*. In the section on bones as organs the mechanisms of growth and modelling are well set out, and there is a good account of the functional adaptation of bones though not of the changes which occur from adult life to old age.

The rest of the book deals with the pathology of bone, and here again there are serious omissions. Osteogenesis imperfecta, osteopetrosis, achondroplasia, and hereditary multiple exostosis are well described, but dyschondroplasia and the more localised developmental disturbances are not mentioned. The chapter on adaptational deformities of the skeleton could scarcely be better, in particular the sections on the changes in scoliosis and the alteration in the jaw consequent on loss of teeth. The chapters on endocrine, hormonal, and metabolic changes are for the most part sound, but it is puzzling to find frontal hyperostosis considered as a benign tumour. Nothing is said of bone changes in chronic renal failure, Milkman's syndrome, or polyostotic fibrous dysplasia. In the section on neoplasms the effects of tumours on the bones as organs is hardly considered, but the account of tumour histology is stimulating. The description of Paget's disease contains no reference to the recent work on the vascular changes in this condition, nor to Wilton's interesting hypotheses—indeed, the important school of Scandinavian osteopathology is to a large extent ignored, though there are ample and well-arranged references to American, English, and German authors.

Despite its disappointing omissions, this is an admirable book which will be useful to a wide circle of readers.

Recent Advances in Pathology (5th ed. London: J. & A. Churchill. 1947. Pp. 363. 21*s*.).—Prof. Geoffrey Hadfield and Prof. L. P. Garrod have introduced an entirely new chapter on the liver, discussing epidemic hepatitis and also the relationship of hepatic disease to dietary deficiencies; the chapter on nephritis has been rewritten, and the chapters on cancer research revised and rearranged. Additions have been made to the sections on inflammation, the site of antibody formation, and silicosis.

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THE LANCET

LONDON: SATURDAY, NOV. 22, 1947

Europe's Need

WHAT is the present state of continental Europe? How is the health of the people? There can be few doctors in this country and fewer still in America who could give a clear answer. No reliable opinion can be offered without sufficient facts. The reports of journalists who have travelled widely in Europe are conflicting and often based on hearsay or superficial impressions. Doctors returning from the Continent have usually been preoccupied with a single problem in a limited area, and so can give no broad review. Public-health statistics, when obtainable at all, have generally been collected under difficulties; and, since they have not always been correctly analysed, their interpretation is sometimes open to doubt. It has thus been very hard to get a satisfactory overall picture of the present situation, and the International Committee of the Red Cross is the more to be congratulated on attempting a general review.

Summarising information from its delegates in all European countries except Norway, Sweden, Denmark, Eire, Luxemburg, Switzerland, Portugal, and Bulgaria, the committee paints a gloomy picture.[1] There is still an appalling lack of elementary shelter in the areas devastated by war. Essential clothing, and especially footwear, is almost everywhere scarce. The shortage of food for urban populations is in general worse than a year ago, owing to the unbroken succession of poor harvests, and—although this is not sufficiently stressed—through the sudden ending early this year of the vast flow of foodstuffs imported by UNRRA into Central and Southern Europe. It is not surprising that in many countries the infant-mortality rate and general death-rate are still above pre-war levels. (The report claims that the general death-rate is actually rising, but it gives no figures.) In many towns children are now undersized as a result of several years of underfeeding, and rickets is undoubtedly common, though other vitamin deficiencies are notably rare. As might be expected, gonorrhœa and syphilis are still a serious problem in many countries, though perhaps not "simply catastrophic" as the report suggests. While there have been no widespread epidemics of infectious disease, local outbreaks of enteric and diphtheria continue; and malaria, despite vigorous preventive measures, is still prevalent in Italy and the Balkans. Perhaps the most remarkable feature of this post-war period, compared with that after the war of 1914–18, has been the general absence of exanthematic typhus on an epidemic scale—a phenomenon not unconnected with UNRRA's importation of over 4 million pounds of pure D.D.T. into Europe for the prevention of this disease, besides large shipments for the control of malaria.[2] As for tuberculosis, which is without doubt the most important infection in Europe today, mortality figures leave little doubt that it has much increased in many places. At the same time, all such figures need very careful scrutiny. For example, the committee's statement that in the American zone (including the Berlin sector) the tuberculosis death-rate "rose from 20 per 10,000 inhabitants in April, 1946, to 37·5 in April, 1947" seems to be unjustified. For the population of a little over 17 million it would imply between 35,000 and 65,000 deaths in the year, whereas the number of deaths from tuberculosis notified over this period was about 11,000.[3] Also it is not clear why the report singles out Germany as one of the three countries (with Austria and Rumania) where the situation is "particularly disastrous" and pays little attention to Greece and Yugoslavia where the incidence is almost certainly higher. Some of the victims of aggression appear to be in more need of help than Germany, if only because they have suffered privation longer.

The survey ends with a summary of relief needs. No-one who has travelled in post-war Europe would question the continued need for the means of improving local food-production—tools, tractors, draught animals, fertilisers, and seed. Clothing and facilities for feeding children are also required, and (among the medical supplies) surgical instruments, dressings, penicillin, sulphonamides, arsenicals, and D.D.T. The primary need of infants is for dried milk, with sugar and farinaceous foods a very secondary requirement; and in this connexion it is to be hoped that the International Red Cross will consider the recent recommendations of F.A.O. and the World Health Organisation on relief for children.[4] Owing to the termination of UNRRA before its task was finished, the health of many thousands of people in Europe depends for the moment on the efforts of the International Red Cross and other relief agencies: there has been a gap in the larger measures of relief. But the damage of war has gone far deeper than was at first supposed, and the fundamental need is not so much relief as the means to recovery. We must hope that this will yet be met through the great American "investment in humanity" known as the Marshall plan.

1. Health Conditions among the Civilian Populations of Certain European Countries Affected by the War. No. 3, revised edition. Geneva: Comité International de la Croix Rouge. August, 1947.

Carotid Ligation

THE surgeon generally approaches ligation of the carotid arteries with a feeling of uncertainty; for, as JEFFERSON [5] has pointed out, the pattern of the circle of Willis is incomplete in 8% of normals, and this defect is particularly serious if both anterior cerebral arteries take origin from the same side of the arch. No great reliance is now placed on preoperative tests for the presence of such congenital anomalies. LAHEY and WARREN [6] conclude that the percutaneous compression test of MATAS "is of value only when positive in the production of symptoms." Protracted carotid compression each day, without incident, may yet be followed by postoperative catastrophe—perhaps

2. Sawyer, W. A. *Amer. J. publ. Hlth*, 1947, **37**, 41.
3. *Lancet*, July 26, p. 144.
4. Report on Child Nutrition from the Food and Agriculture Organisation and the World Health Organisation (Interim Commission), Washington, D.C., July, 1947.
5. Jefferson, G. *Proc. R. Soc. Med.* 1947, **40**, 419.
6. Lahey, F. H., Warren, K. W. *Surg. Gynec. Obstet.* 1947, **85**, 281.

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because the vessel ligation induces temporary intracranial vasospasm. LAMBERT ROGERS [7] holds that electro-encephalography, after temporary ligation, yields better information about the brain anoxia; and this, combined with dynamometer testing of the limb, should be an invariable prelude to final ligation. But an electro-encephalograph is seldom at hand, and there are many snags in interpretation. There may, moreover, be no local signs, cerebral ischæmia declaring itself later by epileptiform seizures, blackouts, or mental changes such as inability to concentrate, difficulty in remembering words, and even dementia. Ligation is best carried out under local anæsthesia, since a general anæsthetic may increase cerebral anoxia.[8] For the patient with carotid-vessel injury, however, general anæsthesia is a merciful procedure, for often he is dyspnœic and restless, and certainly he is anxious.

In support of his claim that common-carotid ligation is "safe" LAMBERT ROGERS quotes figures from JEFFERSON, OLIVECRONA,[9] and SCHORSTEIN.[10] SCHORSTEIN has said that the danger is cerebral anoxia rather than thrombosis; and the first consideration, especially with emergency ligation, is attention to the general condition, any blood loss being corrected by rapid blood-transfusion. It is odd that KOCHER regarded common-carotid ligation as a "death sentence for the old man" whereas so astute an observer as MONT REID [11] thought such operations safer in the old than in the young. Most of their ligations, however, were for traumatic cases; and the greater optimism which prevails nowadays is perhaps due to the use of massive transfusions. For the ruptured intracranial aneurysm JEFFERSON [5 12] has long advocated common-carotid ligation, and experience suggests that such "Hunterian ligature" slows the blood-stream enough to cause clotting within the aneurysm sac. LAMBERT ROGERS also favours this procedure, and quotes MAGEE'S [13] review of 150 cases in which there were 98 survivors from the first hæmorrhage but 50 of these had a further hæmorrhage, from which 32 died. Such a simple measure seems preferable to applying clips to the neck of the friable aneurysm sac, or to DANDY'S use of clips above and below the sac origin.[14] JEFFERSON, from an unrivalled personal experience, concludes that persistent pain is the danger-signal of the "alive" aneurysm, and this estimate can be confirmed by arteriography.

Ligation of the internal carotid is more risky. Statistics are confusing, for it is often hard to decide whether a death has been due to the operation or to the hæmorrhage for which it was usually undertaken. In 49 cases collected by SCHORSTEIN 8 patients died and 11 developed paralysis. LAHEY and WARREN think this ligation very hazardous; and for carotid-body tumours they recommend exploration, leaving the tumour alone if dissection indicates that internal-carotid ligation will become necessary. While SCHORSTEIN holds that embolism is not a frequent cause of disaster following ligation, DANDY and ROGERS both consider it important. ROGERS advises resection of the cervical segment of the internal carotid at the same time as ligation, so as to remove a stagnant cul-de-sac. The vessel, however, is deeply situated and is crossed by important nerve branches, and the patient is still left with an intracranial blind stump. Anticoagulants, as LICHTENSTEIN points out, may have a place, particularly in the traumatic or secondary-hæmorrhage case, where low blood-pressure over a long period has permitted extensive thrombosis within the cerebral arteries. Symptoms of slow and late onset may indicate venous thrombosis within the sluggish stream,[15] and they point to the need for anticoagulant therapy.

The frequency with which anastomosis of injured arteries is now successfully undertaken suggests that surgeons have been too gloomy over the prospects of vessel repair. Preliminary control is essential, and "stick sponges," as recommended by LICHTENSTEIN, are useful for temporary hæmostasis to clear the field. With low wounds they can be passed behind the clavicle to permit pressure, while the field is enlarged, if need be, by excision of the sternoclavicular joint. Such "sticks" are also of value for locating the venous bleeding site; hurried grasping of veins is particularly dangerous, for the hæmostat is likely to tear even more the thin walls. Opinion now seems opposed to the deliberate associated jugular-vein ligature; LAMBERT ROGERS declares that electro-encephalography shows this to increase brain anoxia. Little is known about the possible value of cervical sympathectomy coincident with the ligation, for few neurosurgeons appear to practise it. For traumatic carotid aneurysms LEARMONTH [16] performs a sympathectomy on the opposite side, and seven days later a sympathectomy on the side of the aneurysm operation; and at the recent International Conference of Surgeons one speaker showed arteriograms indicating that this procedure promotes cerebral vasodilatation. OLIVECRONA believes that periarterial sympathectomy and carotid-sinus excision are of definite value at the time of the ligation. The surgeon may be compelled, particularly in traumatic injuries, to ligate both vertebral and common-carotid artery at the same time: LEARMONTH [17] has reported one such case, in which an uninterrupted convalescence was followed by pattern seizures, "blackouts," and total invalidism. SHUMACKER [18] has done an apparently successful double artery ligation, but gives warning that ligation of the vertebral artery may by itself cause cerebellar degeneration without evidence of embolism or thrombosis. The vertebral artery may be affected in BLALOCK'S type of operation for congenital pulmonary atresia, after which temporary brain effects have in fact been observed. Correlated studies of the carotid and vertebral arteries are of particular importance with basilar-artery aneurysms. "For these," as JEFFERSON puts it, "surgery has no answer"; and this is reflected in MCDONALD and KORB'S [19] 143 collected cases of which 139 were "post-mortem discoveries."

7. Rogers, L. *Brit. J. Surg.* 1947, **35**, 51.
8. Lichtenstein, M. E. *Surg. Gynec. Obstet.* 1947, **85**, 165.
9. Olivecrona, H. *Acta chir. scand.* 1945, **91**, 353.
10. Schorstein, J. *Brit. J. Surg.* 1940, **28**, 50.
11. Reid, M. R. *Ann. Surg.* 1935, **102**, 926.
12. Jefferson, G. *Brit. J. Surg.* 1938, **26**, 267.
13. Magee, C. G. *Lancet*, 1943, ii, 497.
14. Dandy, W. Intracranial Aneurysms, Baltimore, 1944.
15. Parry, R., Rogers, L. *Brit. J. Surg.* 1939, **27**, 179.
16. Learmonth, J. R. *Proc. R. Soc. Med.* 1946, **39**, 483.
17. Learmonth, J. R. *Brit. J. Surg.* 1945, **32**, 321, and Association of Surgeons' meeting, Oxford, July, 1947.
18. Shumacker, H. B. *Surg. Gynec. Obstet.* 1946, **83**, 625.
19. McDonald, C. A., Korb, M. *Arch. Neurol. Psychiat., Chicago*, 1939, **42**, 298.

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Drug-induced Statements

ENGLISH law does not allow an accused person's confessions or admissions to be used against him unless they were freely and voluntarily made; the burden of proof is on the prosecution to satisfy the judge that they were not induced by any promise of favour or advantage, or by the use of fear or threats. Liquor may loosen a man's tongue; the sheer fatigue of long-continued questioning or the use of "third degree" methods may break down the reticence or damage the defence of persons detained by the police. The report of the Royal Commission on Police Powers and Procedure, published in 1929, confirmed and emphasised the rule that this kind of trick to obtain confessions is not tolerated in this country. In the United States it does not seem certain that their use will be prohibited—so long as they are employed in a manner calculated to obtain truthful results. Do the two Anglo-Saxon communities differ in their views of fair play to the accused? If so, is the difference due perhaps to the varying levels of success in the enforcement of the law? Is it that we in this country are content with the orthodox methods because our Scotland Yard and our local detective staffs manage to attain a reasonably high proportion of convictions in cases of crime?

These questions are prompted by an interesting article,[1] well documented with references to American case law, by Mr. LEON M. DESPRES, a member of the Illinois bar. Here is a detailed study of the so-called "truth drugs" or "lie-detectors." If it can be claimed as the experience of anæsthetists or obstetricians that, under the influence of certain drugs, a patient will make spontaneous and revealing disclosures, and if similar stimuli could succeed in cases of amnesia where a man cannot recall his own name or address, or in cases where the psychiatrist is seeking the key to repressions, why not apply the like process in defence of the community against the criminal? A year ago, says Mr. DESPRES, the prosecuting authorities in Cook County, Illinois, caused a psychiatrist to give a series of injections of sodium 'Pentothal' to William Heirens, a 17-year-old boy arrested in an attempted burglary and suspected of some sensational murders. This elicited, it is said, an admission that he had committed three murders and a number of burglaries later found to exceed five hundred. When this led to his written confession and his pleading guilty, the newspapers were bound to proclaim the success of the new "truth serum" in promoting the identification and conviction of a criminal. Nor need the "serum" be the monopoly of one side only. Dr. ROBERT E. HOUSE, whose writings on this subject are authoritative, recorded twenty years ago that a physician injected scopolamine into two convicts in Dallas county gaol and established to his satisfaction that they were not guilty of the crimes charged. Dr. W. F. LORENZ,[2] writing in 1932 on Criminal Confessions under Narcosis, considered the use of drugs far more effective in clearing the innocent than in convicting the guilty. But in 1926 the supreme court of Missouri rejected a defendant's offer to support his innocence by testimony of statements made while under the influence of a drug. A doctor was ready to depose that the accused had, under the influence of a "truth-telling serum," denied his guilt. "We are not told," said the court sceptically, "from what well this serum is drawn or in what alembic its alleged truth-compelling powers are distilled. Its origin is as nebulous as its effect is uncertain. . . . The trial court . . . ruled correctly in excluding this clap-trap from the consideration of the jury." Mr. DESPRES thinks that this decision would be universally followed by other American judges today. "The unreliable nature of the statement and the suggestibility of the subject would make any court hesitate to disorganise a trial by allowing admission. . . . Although widely used by police, by employers, by insurance companies and others to detect deception, the 'lie detector' test has not yet established itself as sufficiently trustworthy to be admissible in evidence." One court has refused to admit the tests of a "lie-detector" even when both sides were ready to let them be put in.

Textbooks on both sides of the Atlantic deal with the forensic use of information obtained by using drugs to get statements which in themselves are inadmissible. It is unnecessary to remind medical practitioners that an injection against the will of the patient is an assault. Mr. DESPRES raises another question: if in the course of the proper medical use of a drug like sodium pentothal the physician hears a confession of crime, what is his duty? Mental patients include a proportion who are, in the legal sense, criminals as a result of mental ill health; the question is therefore by no means academic. The Hippocratic oath and the acceptance of professional secrecy give the answer. For the rest we may note his conclusion that, while the therapeutic use of sodium pentothal and related drugs must be encouraged, their injection into unconsenting criminal suspects is premature until society fully accepts the principle and practice that law-breakers are to be treated and corrected rather than punished, and that the aim of criminology should be the speedy cure and rehabilitation of the criminal without regard to traditional ideas of retribution and public punishment.

1. *Univ. Chicago Law Rev.* 1947, **14**, 601.
2. *Wis. med. J.* 1932, **31**, 245.

Group Practice

IN the United States group practice has been developed on a scale unknown in this country. In their latest broadsheet[1] P.E.P. attribute its growth partly to the desire of doctors to provide a full service in undeveloped regions—particularly rural areas—and partly to their desire, by pooling resources, to provide a service within the means of their patients. A third motive has been the wish among doctors for coöperation and consultation; day-to-day consultations are supplemented by staff meetings and good record systems. Within the group financial competition is eliminated, though friction may still arise over the allocation of fees, and personalities may clash: some doctors are regarded as unsuitable for group work because they are uncoöperative by habit or temperament. Conditions in the U.S.A. are very different from those that will prevail in Britain with the new health service; but P.E.P.'s report may be profitably studied for its lessons on the benefits and drawbacks of close integration in medical practice.

1. Medical Group Practice in the United States. *Planning*, Nov. 14 (no. 274). From P.E.P., 16, Queen Anne's Gate, London, S.W.1. 2s. (post free).

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Annotations

TOWN PLANNING

THE success of town planning may be measured by the number of people saved from hospital. This view was put forward on Nov. 5 by Mr. Arthur Ling, senior planning officer in the L.C.C.'s architects department, in a lecture at the Royal Institute of Public Health and Hygiene. The purposes of town planning, he suggested, are to eradicate the environmental causes of sickness, and to create a harmonious and healthy background for an enjoyable life. Over four-fifths of the population live in urban areas, where, owing to the high value of land, sites have been intensively exploited. In 1936 10% of families in England and Wales were found to be overcrowded, while in some parts of Scotland the proportion was even higher: the figure for Clydebank was 44% and for Motherwell 40%. It is not sufficiently known that just before the late war no less than 60% of families in the County of London were sharing houses in non-structurally separated buildings; the sharing of accommodation, and notably of a kitchen, is the source of constant friction.

Hitherto the better properties have usually been sited on high ground, while overcrowding has been greatest on low ground. Owing to the larger cost of land on high ground local authorities have often been compelled to acquire for housing estates low-lying sites close to railways or industries. More open space is needed in towns; statistics prove that death-rates are highest where there is least open space. In the last fifty years cities have sprawled out into the countryside: the town has been taken to the country. Now the trend must be reversed and the country brought to the town. The key to redevelopment is a national policy for the redistribution of industry and population. Workers now commonly live far out from the centre of cities, but the industries which employ them remain at the centre. Workers thus have an excessive amount of travelling, with consequent expense, loss of time, tiredness, liability to infection, and tendency to a time-killing attitude of mind. Two-thirds of London Transport's traffic is accounted for by the movement of workers. During the late war Mr. Ernest Bevin, as Minister of Labour, estimated that if this travelling time could be halved production would rise by 10%. Staggering of hours, transfer of workers in multiple firms to branches near their homes, and improvements in the transport services would relieve the congestion. But the only real solution lies in planned decentralisation of industry to new towns, and in local decentralisation to the suburbs, whereby as many employees as possible would live near their place of work, and the flow of one-way traffic to and from towns at the start and end of the day would be superseded by a two-way flow. A more obvious defect in the present design of our towns is reflected in the figures for road accidents. Of 6000 fatal accidents in 1936–37, two-thirds happened in urban areas. Town roads were designed for horse traffic, and the value of new arterial roads has been nullified by ribbon development. Pedestrians should be segregated by the construction of by-passes, the reservation of certain roads for fast traffic, and eventually perhaps by the building of traffic lanes on different levels. Improvements in the main roads will make possible the formation of neighbourhoods or precincts; happy examples of precincts are to be found in the Temple, Lincoln's Inn Fields, and the colleges at Oxford and Cambridge. The concept of the neighbourhood has now been generally accepted. These should be as far as possible self-contained, and they should include community buildings. In planning health centres the usual proposal is that one centre, with 6–8 doctors, shall serve about 20,000 population. This does not fit in, however, with the structure of the neighbourhood, with its 6000–10,000 population; and Mr. Ling thought that centres serving so large a group might be too remote from the everyday activities of its users.

The town-dweller is constantly exposed to the din of traffic, with its subtle but serious effects on health. Every transport vehicle should be tested for noise emission; and where noise cannot be eliminated a policy of segregation should be pursued. Through atmospheric pollution central London gets only half as much sunshine as Kew. Two-thirds of the pollution is due to the domestic chimney. The nuisance could be controlled if households gave up their open fires or used smokeless fuel. Perhaps district heating might be developed; a great deal of heat now lost from the power stations could be distributed on this basis. Last winter's fuel crisis, with the resulting ban on the use of electricity, showed to what a large extent offices rely on artificial lighting. Daylight standards should be improved; and a new code has been prepared by the Ministry of Town and Country Planning. In this, as in other aspects of town planning, Mr. Ling concluded, the planners should work in close partnership with those responsible for the health services.

REGIONAL ILEITIS

REGIONAL ileitis is a rare disorder, but, as Professor Merke shows in his latest report,[1] it is not so rare that we can afford to forget it. Of the 9 cases he describes, 3 had been submitted to operation on the mistaken diagnosis of acute or chronic appendicitis. Merke holds that this error, and the usually long delay in diagnosis, would not be encountered if the condition were more generally borne in mind. The duration of symptoms in his cases varied from four weeks up to at least eleven years; and the symptoms were strikingly uniform, consisting in colicky pain and diarrhœa. Among the other diagnostic points are a consistently positive benzidine test in the fæces and, often, a positive indican test in the urine; the blood-sedimentation rate is increased. But diagnosis hangs on the radiological findings: barium is delayed in the lower ileum, and advanced stenosis of the ileum close to the ileocæcal valve may be observed; sometimes an "ulcer crater" can be defined. Pathologically, the naked-eye appearance resembles that of tuberculosis; and Merke is indeed inclined to regard this obscure lesion as tuberculous. In 5 of his 9 cases there were manifestations of tuberculosis elsewhere in the body; and in 2 further cases there was a history of tuberculosis in the patients' households.

SNORING

SNORING, though a widespread habit, has had little attention from the medical profession; yet it is often a nuisance to the snorer himself, and it is certainly a nuisance to his associates, as many found during the war in the community life of the Services. To some extent it is a disorder of civilisation; apparently wolves never snore, whereas the domestic dog does. It is also a disorder of certain times of life: the child is often a snorer, the adolescent rarely; the practice is commonest in late middle life and old age.

The noise is produced by vibration of the soft palate and posterior faucial pillars, usually during inspiration through the mouth. A reservoir of air is formed in the nasopharynx, and vibration occurs when a certain relative position of the palate and tongue is reached. The damping effect is produced by the texture of the palatopharyngeal musculature together with the thickness of the tissues involved, of which the mucosa is the most important. The normal resting position of the tongue and soft palate varies with age. In the babe the two structures are

1. Merke, F. *Schweiz. med. Wschr.* 1947, p. 751.

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closely apposed through sucking, but when chewing starts the two move farther apart and snoring becomes possible with mouth-breathing. In adults muscle tone is an important controlling influence, irrespective of nasal airway. The position of the tongue is governed to some extent by the shape of the mandible; and it is also affected by sleeping on the back and by deglutition. Snoring ceases during the act of swallowing and is resumed only if the tongue returns to the critical position for palatal vibration. There may be a central reflex governing the tone of the glossopharyngeal musculature; and the fall in the production of adrenaline during sleep, with the resulting diminution of muscle tone, may explain some types of snoring. Minor nasal disorders leading to thickening of the mucosa are an important factor.

Mr. I. G. Robin, in an address on Nov. 7 to the section of laryngology of the Royal Society of Medicine, suggested that in treatment any anatomical intranasal obstruction should be removed, and any allergic condition corrected. The withdrawal or reduction of irritants such as tobacco, and attention to diet and habits in plethoric individuals help to prevent mouth-breathing. At night children who have acquired the habit can wear an orthodontic splint, or a strip of strapping across the corner of the mouth. In adults where loss of muscle tone is the important factor breathing or phonetic exercises may retrain neuromuscular control; or an orthodontic splint may prevent the tongue and palate assuming their critical relative positions. Anything to stop the snorer from rolling on to his back is useful: the old remedy of a cotton reel sewn into the back of the pyjamas has been suggested. The heroic method of injecting sclerosing solutions into the palate and fauces has been used, but it is hardly to be recommended.

TRICHOMONAS VAGINITIS

THE treatment of *Trichomonas vaginalis* vaginitis is often unsatisfactory owing to faulty diagnosis, inadequate prophylaxis, and improper application of whatever remedy is used. Reich, Button, and Nechtow [1] have reviewed in detail 153 cases out of 2080 examined for suspected infection, and their conclusions are instructive. Careful history-taking and examination may reveal certain characteristic features, such as an irritating vaginal discharge with secondary vulvitis and pruritus; sometimes bladder symptoms are present, suggesting urethritis and trigonitis; and in bad cases dyspareunia, spasm of the vulva, and a feeling of discomfort in the vagina are also complained of. Inspection of the vagina shows the characteristic thin yellow frothy discharge, which may be profuse. The vault of the vagina and the cervix are acutely inflamed, with pinpoint petechial patches which bleed on instrumentation; the cervix often shows coincident lesions such as erosions, polypi, and cysts. The clinical diagnosis is confirmed by passing an unlubricated speculum and taking a hanging drop of vaginal secretion from the posterior fornix with a long tapering glass tube and rubber suction bulb. The number of trichomonads present in a high-power field varies from less than 3 to more than 8. If the bladder is infected the hanging-drop examination is made from a centrifuged catheter-specimen of urine; a gram stain should be done to determine the presence of secondary infecting organisms.

An exact diagnosis having been made, Reich and his colleagues place the patient on a course of home treatment, after preliminary outpatient treatment. The latter involves cauterisation of any cervical erosion, removal of polypi, and cauterisation of cysts. The Skene's ducts, if infected, are fulgurated, and the vagina is dried and insufflated with powder containing 20% finely pulverised mild silver protein, 40% kaolin, and 40% β-lactose. The patient is then told to douche with a weak solution of vinegar (1 drachm to 1 pint); to insert every night a capsule containing the same mixture of silver protein, kaolin, and β-lactose; and to return for re-examination in a week. Certain important hygienic instructions are given: (1) the anus must be cleansed from before backwards; (2) the hands must be washed before any vaginal manipulation such as inserting tampons or pessaries; (3) the external genitalia must be washed before douching, and the douching apparatus must be sterilised; (4) intercourse must be regarded as a possible source of reinfection; and (5) the bath must be scrupulously clean. There is no doubt that the rectum, the mouth, and the penis are all possible sources of infection. Douching and the insertion of medicated pessaries must be continued during menstrual periods: every gynæcologist knows that infections of the lower genital tract tend to flare up after a period, and interruption of treatment may be one cause. Proved cases of trichomonas infection should attend for observation for six months. For this régime Reich claims 98% successes.

1. Reich, W. J., Button, H. L., Nechtow, M. J. *Surg. Gynec. Obstet.* 1947, 84, 891.

RESEARCH IN POLAND DURING THE OCCUPATION

SUBOPTIMAL conditions, whether they are social or technical, seldom defeat the keen observer or research-worker. During the late war many origiñal observations were made, with primitive equipment, in prisoners' camps and in even more difficult circumstances. Recently published in an American journal are two papers based on work done in Poland in 1942 by Dr. Ludwik Fleck.

The first,[1] written with Zofia Murczynska, deals with the agglomeration, in shed blood, of the white corpuscles into small clumps of the same types. When the leucocyte layer from centrifugalised citrated blood was incubated at 37°C, and specimens were removed at short intervals and examined as thick films, it was found that after 3–5 hours leucocytes of the same type tended to agglutinate in small groups—i.e., each group consisted almost entirely of polymorphonuclear leucocytes, or lymphocytes, or some other variety. When he first described the phenomenon in 1942 Fleck called it "leukergy," and he now lays down certain standards whereby it can be estimated, taking into account the proportion of white cells in a preparation which are clumped and the average number of cells in each group. The lowest value is given to preparations showing only an occasional agglomeration of white cells with 3–4 cells in each clump, and the highest value is reserved for preparations showing almost all the white cells clumped in groups of 6–15. In acute inflammatory processes the leukergic value tended to rise with the leucocyte-count and the red-cell sedimentation-rate but the rise appeared to persist longer; and in animals injected with bacterial antigens it followed the same lines. The technique of estimation is not given in full detail, but the method suggests that the experimental error may be considerable. Nevertheless the observations are interesting, and possibly more extensive and controlled experiments would indicate relationships with allied phenomena.

In the second paper [2] Fleck describes the presence in the urine of typhus patients of a substance having the characters of a specific antigen of typhus rickettsiæ. This substance may appear in the first days of the disease and in amount sufficient to give a characteristic precipitin reaction with a typhus serum. Injected into rabbits, it may give rise to rickettsial, and also proteus OX19, agglutinins. By suitable treatment of the urine the antigen may be concentrated so that it can be used as a prophylactic; indeed by this means Fleck prepared enough antigen to immunise some 500 inmates of a concentration camp in Poland during the war when no other prophylactic was available, and though it was impossible to keep proper records there was some evidence of its value. The most important of these

1. *Texas Rep. Biol. Med.* 1947, 5, 156.
2. *Ibid*, p. 168.

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observations is, of course, the early immune reaction, which was independently described by Leon [3] in Mexico in 1942. Unfortunately this does not seem to be found often enough in the less severe cases to give it much diagnostic value. It is in the severe case where the kidney is more affected that one would expect urinary excretion of rickettsial substances to be greatest.

Fleck mentions false positive results both with normal serum and with urine from non-typhus cases; but the test is simple to carry out and in a typhus outbreak its extended trial may yield valuable information.

HEALTH IN THE POTTERIES

LEAD poisoning and silicosis have long been known to be the main occupational health risks in making and decorating pottery. Lead enters into the composition of glazes, and free silica in various forms into both glazes and pottery bodies. Ground flint, which contains a high percentage of free silica, has also been freely used in pottery-making for various other purposes such as the "placing" of biscuit ware (or unglazed pots) for firing-in ovens.

Since the beginning of the century much progress has been made in reducing the incidence of lead poisoning and silicosis by two standard methods—namely, exhaust ventilation to remove dust from the workers' breathing area, and replacement of the noxious agents by less harmful ones. Leadless glazes have in many cases replaced those containing lead, and a further innovation has been the low-solubility lead glaze, the principle of which was discovered about 1900 by Sir Edward Pope, at that time Chief Government Chemist, when he fused raw lead compounds with silica to produce a "frit" or lead silicate which is relatively insoluble and therefore less poisonous than red or white lead. The result of these improvements can be seen in the figures for lead poisoning in potteries: in 1900 210 cases with 8 deaths were notified, but in 1944 and 1945 none at all. Likewise the practice of using ground flint for the placing of biscuit ware for firing was productive of much dust and many cases of silicosis; but it has been discovered within the last fifteen years or so that powdered alumina, which has refractory properties comparable with those of flint or quartz, will serve the purpose equally well, and its dust is relatively harmless when inhaled by the workers. Since then flint has been replaced by alumina for placing biscuit ware in most of the potteries in the country.

The new code of regulations issued by the Ministry of Labour and National Service [4] crystallises the advances made in preventive measures during the present century and should bring any backward potteries into line. These regulations prohibit the use of raw lead glazes in the manufacture and decoration of pottery after Oct. 7, 1948, and in the manufacture of glazed tiles after Oct. 7, 1949. The actual wording is that "no glaze which is not a leadless glaze or a low solubility glaze shall be used" after the specified dates. Again, after Jan. 7, 1948, ground or powdered flint or quartz shall not be used (1) for the placing of ware for the biscuit fire; (2) for the polishing of ware; (3) as an ingredient in a wash for saggars, trucks, bats, cranks, or other articles used in supporting ware during firing; or (4) as a dusting or supporting powder in potters' shops. Another important regulation is that, with certain exceptions, ground or powdered flint must not be brought into a factory in a dry state, but must come in as a slop or paste. Unfortunately this prohibition cannot be made absolute, and a subsection provides that dry powdered flint or quartz may be brought into a factory if the containers are so sealed and enclosed as to prevent the escape of dust. The subsequent processes of handling and mixing to form the body of the ware must also be done in such a way that no dust escapes into any place where people are employed.

The new regulations should go far to make the potters' ancient craft a more healthy one.

TOBACCO ANGINA?

THIS unfortunate term, originally introduced nearly fifty years ago by Huchard,[1] dies hard. One reason is that there is still no convincing evidence of a direct relation between smoking and angina pectoris. It has proved almost impossible to evolve an experiment that will produce a definite "yea" or "nay," and even when man himself is the experimental subject there are many factors to complicate the issue. Thus Pickering and Sanderson,[2] in a detailed study of one patient, show that though in this individual angina pectoris followed smoking it did so only just after the subsidence of an attack of pain precipitated by exercise, when the blood-pressure and pulse-rate were still raised.

Even the many reports which attribute changes in the electrocardiogram to a direct effect of smoking on the heart are under suspicion, because care has not been taken to exclude the possibility—often the probability—of these changes being due not to the smoking but to the changes in pulse-rate which it induces. Impressed by the absence of convincing electrocardiographic evidence, Bryant and Wood [3] have studied 16 patients with coronary disease, all of whom were smokers but none of whom gave a history suggesting a relation between their anginal symptoms and the use of tobacco. Unipolar limb and chest leads were used and electrocardiograms were taken at rest before and after the smoking of two cigarettes. In 2 patients angina pectoris, accompanied by electrocardiographic changes, followed this procedure: in one of these the pain was induced only by smoking; in the other it was induced by exertion and by smoking. In the patient with "tobacco angina" the pain and electrocardiographic changes were not associated with any rise in pulse-rate, and some ten months later he reported that he had given up smoking and had had no further attacks. It is dangerous to argue from the particular to the general, especially when the particular means one case; but extended investigation on these lines might help to solve a vexed problem. Unless, and until, such an investigation shows that smoking alone can produce angina pectoris, clinicians will be justified in contending that, per se, it is not an important factor in the genesis of this condition. Sir Maurice Cassidy, from an analysis of 1000 cases of coronary disease seen in his own practice, has stated that "so far as so-called 'tobacco angina' is concerned, I have never encountered such a condition" [4]; and even in these days of laboratory medicine such a statement must be given serious consideration.

NOBEL PRIZE FOR CHEMISTRY

THE award of a Nobel prize to Sir Robert Robinson, P.R.S., comes as no surprise. It is probably fair to say that he has made more positive contributions to synthetic organic chemistry than any man, living or dead. Where other eminent organic chemists have been content to till one or two fields, he has raised crops from many. His work on the alkaloids, for example, is outstanding, and this perhaps is his favourite line; but he is known equally for his achievements with anthocyanine pigments, antimalarial compounds, penicillin, sterols, and sex hormones; while his Faraday lecture at the recent centenary celebrations of the Chemical Society showed that he is equally at home in purely theoretical chemistry. Many good wishes will go to Sir Robert and Lady Robinson, herself a distinguished chemist, on this present recognition of his genius.

3. Leon, A. P. *Rev. Inst. Sal. Enferm. trop.* 1942, **3**, 201.
4. The Pottery (Health) Special Regulations, 1947, dated Oct. 7, 1947, made by the Minister of Labour and National Service under section 60 of the Factories Act, 1937. S.R. & O., 1947, no. 2161. London: H.M. Stationery Office. 1*d*.

1. Huchard, H. Traité clinique des maladies du cœur et de l'aorte, Paris, 1899.
2. Pickering, G. W., Sanderson, P. H. *Clin. Sci.* 1945, **5**, 275.
3. Bryant, J. M., Wood, J. E. jun. *Amer. Heart J.* 1947, **34**, 20.
4. Cassidy, M. *Lancet*, 1946, ii, 587.

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Reconstruction

HOSPITAL BUILDINGS OF TOMORROW

FROM A CORRESPONDENT

"Si tous les perfectionnements de la technique moderne y ont été appliqués dans les installations de traitement, ils n'ont pas fait oublier l'élèment psychologique si nécessaire au malade qui entre là dans une grande maison accueillante, disposée au milieu de la nature toujours vivante, au lieu d'avoir le sentiment d'être happé par une mécanique.

"Au monstrueux entassement des malades dans des constructions éclipsant et blessant la nature, dont l'architecture semble vouloir frapper d'étonnement les populations, il semble préférable d'appliquer à de telles réalisations une conception plus humaine, plus française aussi."

—A. LABOURIE, *Architect. française*, Oct.–Nov., 1945, p. 61.

WHEN are we going to evolve a really satisfying design for our greater hospitals? Two at least of those in the metropolis are to be rebuilt as soon as conditions permit, and those responsible are already busy scheduling their requirements. Charing Cross is to go to Harrow, and St. George's—the old building looks remarkably distinguished in its new coat of cream paint—is to move to Tooting. And in several of the great cities of the provinces similar projects are afoot.

The tendency towards a functional simplicity of design seems to have set in strongly, and the trends of the 1930's come out clearly in the great rectangular blocks of the Queen Elizabeth at Birmingham and the St. Helier in Surrey. The Queen Elizabeth contains some 720 beds and St. Helier was planned for 862, but one cannot visit these hospitals without a feeling that something has been sacrificed; well designed and well finished as they are, they lack something of repose and dignity. They do not settle happily into their surroundings, and one feels that in wintry English weather the cold winds must blow icily around the wards. There are still hospitals to be found, like St. Thomas's or King's College, which manage to express in their architecture a more satisfying tradition. Must we, in the interests of modernity and efficiency, expect to see more Queen Elizabeth's and St. Helier's or other variants on the Continental and American models? To say this is certainly not to disparage the architects, for they have had to conform to current conceptions of what is required in hospital construction.

LOSSES

What exactly is it that has disappeared in the interests of utility? First, there is the break with tradition. The traditional building for community life in this country, not only for hospitals but for colleges and schools, is the quadrangle or some modification of it. No-one can be familiar with the quadrangles and courts of Oxford and Cambridge without knowing that they possess qualities of repose and peacefulness for which height is no substitute. Mere height is barrack-like and forbidding. Does it matter? Opinions will differ, but it is hard to imagine the student nurse of today acquiring much affection for the gaunt lines of her utility home. Perhaps it matters more than one would at first sight suppose that the hospital buildings should link themselves by an easy association to our famous schools and colleges.

Secondly, there is the loss of intimacy with lawns and trees with every story up from the ground. The sunlight on the foliage becomes less accessible, until the distant prospect of Birmingham chimneys or suburban London dormitories wholly replaces it. Compare with this the wide windows and garden outlook of some of the wards at King's College, or the London plane trees that glitter in the sunlight outside the wards of Queen Square; even the hard-hearted must admit that perhaps there is something in it, and that perhaps patients do after all feel more comfortable and more at home down on the garden level. It is a factor in the attraction of the cottage hospitals that so often the wards are at the garden level.

Thirdly, there is the loss of quiet. Steel construction is admittedly responsible for difficulty in controlling noise, and despite every effort to apply modern methods of insulation, the fact remains that the modern steel and concrete hospital is noisier than the old buildings of brick and stone. It is probably colder too, and requires more heat to make it comfortable, though the effects of this are often masked by the existence of modern boilers and central heating.

Fourthly, there is the monotony that is too often associated with utility. Repetition and uniformity in such matters as the design of windows is not in itself a bad thing: one has only to recall the façade of the Royal Crescent at Bath and the long lines of Georgian windows that so easily achieve distinction. But to pass in one of our modern hospitals from one ward to another in exactly the same style and decoration, and to pass from one nurse's bedroom to its twin next door, and so on floor after floor, is to breathe an atmosphere against which surely the spirit of man rebels. Uniformity can, in fact, only be redeemed by a certain generosity of treatment, and the box-like structure of the modern steel-framed hospital proceeds regardless of all but economy. And yet it is not cheap; it is indeed fantastically expensive. A simple utility nurses' home costs today something like £500 per nurse, without trimmings of any kind. The more luxurious examples like those of the Queen Elizabeth would cost £700–800 per nurse. Compare this with the cost of building good small modern houses!

Internally too the long corridors and the magnificent recreation halls in the nurses' homes seem to express the soulless efficiency of the cosmopolitan hotel rather than the homeliness and comfort of so many of our older English buildings. Pictures are conspicuous by their absence. Sometimes indeed a print of flowers or a Medici reproduction has been brought in to fill the void, but much more is surely called for. Where is there any hint in these modern hospitals of the great traditions of English medicine and of English nursing? The authorities seem to have forgotten that the hospital with its hundreds of student nurses and other trainees is also an educational undertaking of no mean size. In all education visible contact with the past and a sense of participation in present progress are needed if the newcomer is to feel part of a greater whole. Where are the quiet corners where the nurse can pick up and peruse the history of the hospital, or, if she be so disposed, copies of the current medical publications? Where are the prints of the old buildings, and the portraits and stories of those that have passed through the school in days gone by and who have achieved distinction? Where is the list of last year's prize-winners, or where even are the miscellaneous and intriguing papers that clutter the notice-boards of the porters' lodges in the colleges of our universities?

THREE TRENDS

But this is a digression. Let us return to the factors that seem to be steering us towards this cosmopolitan uniformity of construction, which seems likely to make our hospitals of tomorrow giants dwarfing all natural objects of the landscape. The factors seem to be pretty clear.

First, there is the tendency towards increase of size. It would take us too far afield to go closely here into the arguments in their various applications to the teaching hospital, to the large all-purpose general hospital, and to the smaller local hospitals; but it may be that the tide is now turning, at any rate in the case of the general hospital. To judge by the latest surveys opinion in America at any rate seems to be hardening

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against units of more than 750 beds. At least the arguments against an indiscriminate increase of size are better appreciated than was the case a few years ago.

Secondly, there is the belief that a vertical design is less exacting in the demands it makes on staff. When the hospital committee sits down to plan in earnest it soon realises that running cost is largely a reflex of the number of staff employed. Requests for increases come in from all quarters; but staff—and especially nursing staff—are not only expensive but are apt to be scarce. Moreover the committee is never long allowed to forget that demands on the time of the medical men must be kept down to the minimum. These considerations seem to emphasise the necessity for a compact design. The wards, it is thought, must not be too far from the kitchens, laboratories, and other central services. The vertical arrangement of the ward units is therefore preferred to the horizontal, even when there are no restrictions on the site, such as dictated the superimposition of the ward units in the case of Middlesex Hospital and of the Westminster.

Thirdly, the steel frame construction has become almost universal where large buildings are concerned. It is cheaper than brick and stone, and lends itself to vertical construction.

It is these three trends that seem likely to take charge and determine the future for us. Is it necessary? Must we say goodbye to the hope that we shall yet see in this country a modern hospital as convincing in its design as many of our older college buildings—and one or two of our older hospitals—and nurses' homes as restful as the medieval quadrangles?

CASE FOR INQUIRY

It seems to be in part a matter of planning, and in part a matter of money. The ward units cannot be spaced out regardless of the central services; but more information is needed on this matter, and exact comparison of the amount of walking involved in some of the most modern examples of vertical design compared with equally modern examples of decentralisation would be of interest. The supposed merits of the vertical construction might prove mythical, or at least exaggerated. In any case it may be that a measure of decentralisation of the catering and other central services would be no bad thing, and here again some detailed data and discussion would be of value. It may too be that it is better to have several nurses' homes rather than one. Even if such decentralisation did prove to carry some disadvantages, it would still be a question whether they would not be far outweighed by some of the points to which attention has been drawn above. Decentralisation does not appeal greatly to those in authority. They—the deans of the medical schools and the matrons of the larger hospitals—have during the war had a good deal of experience of the extreme inconvenience of having part of their hospital located in one place and part in another. It has meant difficulty in control, and a waste of time and energy, and it is only natural that they should lean strongly in the direction of having the whole organisation easily accessible to central control. But it is surely a matter of degree, and if centralisation does militate against our architectural heritage, and all the dignity and peace that it can offer, the sacrifice can surely be too great. May it not in the end have serious repercussions on the availability of staff? If, for example, girls do not like these great buildings and will not choose to nurse in them, what profit is there in all the effort to economise in staff?

OPPORTUNITY FOR BENEFACTORS

In part, however, it may be a matter of money. Hospital construction now demands the fabulous figure of £2000 a bed, perhaps more for the teaching hospital with its special departments. The Minister of Health, it may be said, cannot be expected to have money to spare for such refinements as I have suggested. But even if it be shown that the dictates of economy point all one way, here surely is just the opportunity for the public benefactor to step in and meet the additional cost. Let the Minister fix his figure and make his maximum contribution, and let the voluntary donor, who has in the past willingly supplied money for so much of our hospital construction, provide the extra that is needed to set hospital architecture free from the necessity to conform to the dictates of utility construction. It is difficult to believe that, if the case were properly put and the need for a breakaway from the Continental and American conceptions adequately grasped, there would be any lack of response from those who have the means.

Special Articles

OUR PRESENT DIET

A DEBATE AT THE HUNTERIAN SOCIETY

THE Hunterian Society met last Monday, with Mr. ALEXANDER ROCHE, the president, in the chair, to debate the motion: That Our Present Diet is Undermining the Health of the Nation.

THE MOTION PROPOSED

Dr. FRANKLIN BICKNELL said that, to be healthy, a man must have enough food for a full day's work—namely, 3000 calories. This figure had been agreed by the British Medical Association in 1932 and by the Ministry of Health in 1933; and the League of Nations had set the total even higher. Dr. Edith Summerskill, parliamentary secretary to the Ministry of Food, had stated in the House of Commons that all rations and pointed foods yielded 1530 calories a day. To the total from rationed foods must now be added 139 calories per day from potatoes, which were being distributed on a basis of 3 lb. per week. The new total was thus 1669 calories.

The gap might be bridged with unrationed foods or with meals eaten outside the home. Unrationed foods consisted principally of offal, meat pies, sausages, fish, and vegetables. The first three were so scarce that they virtually did not enter into the reckoning. If fish were eaten each day, this would yield 200 calories, and vegetables a further 40 calories. The grand total was now 1909 calories. The Ministry of Food in its latest survey had found the average consumption to be 2287 calories; but this was before the reduction in the rations of cheese and sugar, and before the introduction of potato rationing; and allowing for these new restrictions the adjusted figure was 2121 calories. It was quite impossible, said Dr. Bicknell, to close the gap by restaurant meals; restaurants provided altogether only $1^1/_4$ main meals and $2^1/_2$ snack meals each week.

There had been cuts in the priority allocations; this must signify either that the priority groups had previously been guzzling at the expense of the remainder, or else that they were now undernourished. The housewife, it was true, needed less food than some other workers; but she had no chance to eat out and thus got no variety in food. It was nonsense to suggest that she ate the "redundant rations" of her children.

No-one knew what food was consumed before the war; and a more relevant question was what was regarded before the war as a satisfactory diet.

If, as he believed, the nation was undernourished, why were there no frank signs of malnutrition? Weight, he suggested, was maintained because the body conserved itself by allowing less work to be done. Mortality-rates,

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it was true, had not risen. In recent years, however, there had been advances in prophylaxis, in maternity and child welfare, and in treatment through the introduction of chemotherapy. Why, then, were the figures not greatly reduced? "Because our rotten diet is wiping out all the benefits." As to morbidity, the incidence of infections involving the eyes and skin had risen; convalescents were taking longer to recover; morals were impaired; and tiredness was a ubiquitous symptom. This deterioration was attributable to bad food, and particularly to lack of fat. Dr. Bicknell found it noteworthy that neither of the two principal speakers against the motion were medical men. "To us who are doctors," he concluded, "the nation is ill."

THE MOTION OPPOSED

Sir JACK DRUMMOND, F.R.S., submitted that there was no certain evidence that the nation was now less well nourished than in 1938. There was, he said, misunderstanding of the calorie position. For every type of individual the approximate calorie requirements were known; and the weighted average was reckoned by taking all groups together. In the hardest years of the war the weighted average was 2550 calories per day. To provide this, food sufficient to yield 2900 calories per day had been distributed. There was a wastage of about 450 calories, or 9–9½%, which compared favourably with the 15% wastage before the war. Then, although there had been enough food to yield an overall average of about 3000 calories a day, a third, if not a half, of the population had been underfed. The war had equalised sacrifice; and the Ministry of Food could show that in recent years there had been little difference in calorie intake between the classes.

Additional fat and meat were simply not to be had; for there was a world shortage. Dr. Bicknell had belittled the scientific approach to the distribution of food; but the relief of Europe and the nutrition of Britain in the war had been undertaken with cold-blooded scientific analysis; and it had succeeded. In working-class families the average consumption of every single nutrient was better now than before the war. Certainly the people of Britain were tired out at the end of the war; they had exerted themselves in the war effort more than any Allied, and probably more than any enemy, nation, and it was natural that they should flock to doctors. Vital statistics were the most sensitive indices of health; all had improved since 1940 and none had gone back. There was, moreover, less anæmia in women, less rickets, and less caries; and the growth of children had increased.

The rationing of potatoes was, however, a serious blow. For the nutritionist calories were almost the whole problem; and an essential feature of any rationing scheme was the maintenance of a buffer of energy. With the rationing first of bread and now of potatoes the position was precarious; it was "very grave indeed." However a calorie shortage did not threaten health, provided that there was no major dietary deficiency. Its main effect would be to lower production. Food moving into consumption at the new level of 2700 calories would barely yield 2550 calories to the consumer. The heavy worker and adolescents would go hungry; they would work less and they would lose weight, but their health would not be undermined. Judging by observations in Continental countries, when times improved they would pick up without demonstrable ill health.

SECONDERS

Dr. KENNETH MCFADYEAN, supporting the motion, recalled that the Minister of Food had admitted that the nation's diet was to him "a matter of grave concern." When Dr. McFadyean spoke of "grave concern" to the wife of a patient, he was preparing her for the patient's death in another day or two. He dismissed, as untrue, psychological explanations of the prevalent hunger. During the last few years at least one general practitioner had drawn attention to the increasing incidence of hypochromic anæmia; and this was a condition in which only fatigue preceded collapse. In one factory anæmia among the workers had been cured by extra protein; and the observation had been repeated in an establishment for the old when the diet was supplemented. He allowed that children of school age, expectant mothers, miners, and dock workers were well enough fed; "but let some one tell me how many women in the last four years have nursed their babies for more than four weeks." And what about the increasing prevalence of gastro-enteritis? Impetigo, epidermophytosis, sycosis barbæ, and inflammation of the eye were now more common, as also were chronic rheumatic infections and patches of choroid degeneration in the young and otherwise healthy. People were not being starved to death, but their health was suffering. Formerly an army was said to march on its stomach; now people were expected to fly on air, "belching forth exports on an empty stomach."

Mr. MAGNUS PYKE, D.SC., questioned whether such infections as epidermophytosis could be attributed to nutritional deficiency. Dr. Bicknell, he held, was not justified in dismissing the quantity of sausages, offal, and meat pies as negligible. Since 1941 surveys had shown consumption per head in the home to be steady at 2300 calories. Speakers for the motion had confused average amounts per head with amounts per man; and the 2900 calories suggested before the war as a desirable intake for an unemployed man had been a man value. It was, he said, notoriously difficult to assess nutrition. Perhaps the most sensitive index of undernutrition was the incidence of tuberculosis; mortality from this disease had been falling steadily and was now lower than ever before. Difficulty in getting enough food was greatest for old people; and yet the fall in the death-rate among the over-65's had been greater in the quinquennium up to 1945 than in the previous twenty years. The explanation was a lowered incidence of obesity, alcoholism, diabetes, and high blood-pressure.

The present overall average of 2700 calories was, Dr. Pyke said, compatible with full vigour. Only 72% of this was obtained from the rations, the remainder being derived from unrationed foods in the home, or from restaurant or canteen meals. The food allocated to industrial category-B canteens was capable of yielding 950 calories, while that provided to category-A canteens was capable of yielding 1095 calories. Altogether 179 million meals were served each week, which for 30 million people meant an average of 6 meals weekly.

No-one liked the diet; but a diet that was disliked did not necessarily malnourish the consumer. In Germany there had been complaints of starvation, and the propaganda on dietetic insufficiency was very similar to that in this country. But recent detailed clinical and nutritional surveys in Germany had not substantiated the complaints.

DISCUSSION

Dr. NEVIL LEYTON suggested that the ration of fat was particularly deficient; the allotment was only 30 g. a day. He claimed to be treating cases of œdema due to malnutrition.

Dr. G. E. BREEN questioned the basis on which Sir Jack Drummond had suggested that a third or a half of the population were underfed before the war. Where did this figure come from? About 50% of infections

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had become controllable in the last ten years; yet this improvement was not reflected in returns. If the Government was unable to obtain the necessary amount of food, it should frankly say so. Dr. Breen charged the professional nutritionist with arrogance; people were not machines, and on a given meal one man would do twice as much work as another.

A PRACTITIONER interjected an appeal for the housewife, who, she said, was tired and haggard because she was feeding the rest of the household on her own rations.

Mr. A. DICKSON WRIGHT had found no signs of malnutrition. Arguments for the motion had been flimsy; it was nonsense to ascribe such infections as epidermophytosis to undernourishment, and the reason why mothers did not feed their children was that they did not want to. So long as the nation continued to spend large sums on the purchase overseas of tobacco and alcohol it should not complain that food was insufficient.

Sir JACK DRUMMOND held that no concrete facts had been produced in support of the claim that the country was undernourished. He recalled that in 1940, when it was announced that calcium was to be added to flour, many doctors, some of them distinguished, immediately wrote and continued for months to write, complaining that this addition was causing illness. Yet actually, owing to supply difficulties calcium was not added until eighteen months later, by which time all complaints had ceased, never to be resumed.

When the motion was put to the house, the Ayes outnumbered the Noes by about three to one.

MEDICINE AND RELIGION

A SERMON TO DOCTORS

IN the course of his sermon at the annual service of the Society of Apothecaries of London on Oct. 28, the Rev. M. F. FOXELL, chaplain to the society, said:

Mankind is not divided into two or even three sections—clergy, laity, doctors. To every one of us there is a span of life. Clergy and doctors are mortal like the rest of mankind. We practise our professions as long as we are able and eventually the end comes. The clergy are prone to temptation and the doctors have their illnesses—and vice versa. And at the last there is the fact of physical death.

And what is the meaning and significance of it all? I do not suppose that the study of thanatology deals with that kind of question. It is a question that is shirked by many. "We do not know," it is said. With many that leads to "We do not care," or "What's the use of troubling about it?" That there is one event unto all surely does not minimise the importance of that event. If we are content to take no more than a physical and materialistic view, not only of the universe but also of life in its highest manifestations, religion can have no place. But such a view ignores a great deal of evidence or waves it on one side by the merely arbitrary method of identifying religion with superstition. Neither of these ways is scientific. . . .

The crux of the whole matter rests ultimately on the belief in the nature of man. As a biological specimen he serves as an amazingly large field for knowledge and research: as a unit of social life he may be but a pawn in the hands of politicians. But the Christian view sees man as an immortal soul; and the Christian way of life includes within its range both his physical and social well-being, but subordinates these to his eternal welfare, in the same relation as time stands to eternity. . . .

There is some confusion of thought in making a scientific and analytical approach to a subject that requires other criteria. There are values that cannot be established by scientific method. This is obviously true of the arts. The truth of Christianity lies outside the limited realm of exact science. Its truth is moral, even æsthetic and eternal. There is a borderland between the two regions, but to make that an impassable barrier and to deny the existence of another kingdom because there are difficulties in passing from one to the other is a grave mistake. And it must be borne in mind that theology is not religion, any more than a study of pigments and composition is art. Religion is a faith and a consequent directing of life. It does not claim to solve every mystery: it sets forth a well-established theory of life, takes full account of the whole man, and relates him to God. According to the belief in the nature of God, so is man given a place in the eternal realm.

In all this we are on the threshold of many and great problems. The mind delights in problems; we even invent games and puzzles to exercise our intellectual ingenuity. But if Christianity is merely regarded as a problem it is missing its purpose. We have to make up our minds about it. The metaphor is an exact one, and one element in the making must be faith. It is my commission to commend the Christian faith. However much it can be discussed and debated by its adherents and its opponents, we need a return from the complications resulting from all the knowledge, all the inventions, and all the turmoil of civilisation to a simple faith. The sophisticated person may smile or scoff at such a notion. Look, he says, at the universe opened up by telescopic view, look at it as seen through the microscope, and then can we still be simple-minded? We certainly can be made to feel humble, unless the advance in knowledge misleads men to a vulgar pride in human achievement: or we may be inclined to feel humiliated to such a degree as to judge ourselves of no account. But all this is too elaborate, and we do not see the wood for the trees; or rather, we do not see the sky for the trees.

The Christian is not an obscurantist, but he is aware of an element in life that all these observable things may obscure unless he looks with the eye of faith. . . . The subject of the Christian religion should not be approached from below—from all the accumulated knowledge of material things, with a vain attempt to find God from scientific evidence; but rather it should be approached from the highest values we know, the noblest characteristics, the best aspirations, the spiritual experiences, whether our own or of the saints, and above all as these are revealed in the person of our Lord Jesus Christ.

Public Health

Poliomyelitis and Polioencephalitis

IN the week ended Nov. 8, 198 cases of poliomyelitis and 12 cases of polioencephalitis were notified, compared with 221 and 22 in the previous week. The smallness of the fall bears out the suggestion in our last issue that the incidence is likely to remain relatively high for some time. The rate of decline has been fairly consistent for the last three weeks, and if it remained the same for the rest of the year there would still be about 100 notifications per week at the end of December.

Infectious Disease in England and Wales

WEEK ENDED NOV. 8

Notifications.—Smallpox, 0; scarlet fever, 1730; whooping-cough, 1072; diphtheria, 219; paratyphoid, 6; typhoid, 9; measles (excluding rubella), 2179; pneumonia (primary or influenzal), 571; cerebrospinal fever, 39; poliomyelitis, 198; polioencephalitis, 12; encephalitis lethargica, 1; dysentery, 105; puerperal pyrexia, 107; ophthalmia neonatorum, 54. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fever, 1 (0) from measles, 1 (1) from whooping-cough, 5 (1) from diphtheria, 61 (3) from diarrhœa and enteritis under two years, and 14 (2) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 186 (corresponding to a rate of 23 per thousand total births), including 29 in London.

DURING the June quarter 27,546 new donors joined the National Blood Transfusion Service—twice as many as in the first quarter—and blood was given by 66,557 donors. There are now about 350,000 donors on the panel. To provide for further increases in the demands for blood and plasma and to ensure that donors are not asked to give blood more often than once every six months, some 168,000 new volunteers are required in England and Wales.

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In England Now

A Running Commentary by Peripatetic Correspondents

IT is a popular urban fallacy that we country-dwellers grow all the potatoes we need. In fact few cottagers have room in their gardens or allotments for more than a week or two's supply, while we "gentry," with gardens of half an acre or so, can get no help (even if we could afford a man at £1 a day) and are doing well if we supply ourselves with other vegetables and fruit. Economically it is unsound to grow main-crop potatoes in a small garden; the cost of manure, seed, and labour considerably exceeds the value of the crop. Even Bill up the road, who grew 5 tons this year in what used to be his nut orchard, found that what he got for them only paid for the seed and labour, so he was down the cost of the manure.

In this part of the country, which being picturesque contains an undue number of large hotels, there are gloomy forecasts of a black market in potatoes. In the arctic spell last winter, they say, the hotel-keepers went round in their cars buying up all the potatoes at 30*s.* a sack; certainly there were none in the shops. Our grocer, who delivers provisions and gossip three times a week, prophesies that potatoes will soon disappear from the shop once more. Even if they don't things are going to be difficult for us who feed at home this winter—and that includes the children in the holidays. In term-time the boys get their midday meal at school, and they get ½ lb. of potatoes a day in that, so they don't do too badly with their ration of 3 lb. a week and an extra B.U. But they (and their parents) will feel the pinch in the holidays, when there are no school meals and no milk-in-school either.

As our grocer says—it all depends on how many meals you can get in canteens or restaurants; if you can feed "out" all the week your rations will do nicely for the weekend. But that is a truly rural point of view.

* * *

In the United States I found that there was a great demand for some English textbooks which were said to be unobtainable because of the paper shortage over here. It is a pity if this notable source of dollars is not being tapped efficiently. There seems to be no shortage of paper in America if one is to judge by the size of the daily and weekly newspapers. The smallest I bought was the *Boston Herald* with 24 pages. The *Chicago Sun* had 48 pages and the Saturday edition of the *Chicago Daily News* 24 ordinary pages with 52 more in three special supplements. The most lavish use of paper was in the *Chicago Tribune* which I bought on Sunday, Oct. 5. This was in ten parts and the sum total of pages amounted to 220. The whole paper weighed 2 lb. 10 oz., and all this was sold for ten cents, which should be equal to fivepence but actually is now nearer sixpence. Anyway 7 oz. of reading matter for a penny cannot be considered dear, though if one read the editor's none-too-friendly comments on England one might revise that opinion.

* * *

Peripatetic Correspondence, Letters to the Editor, Annotations, Leaders, Original Articles—thus your correspondent of Nov. 1 digests his LANCET. This is indeed a dignified and mature approach (he says himself that he is getting old), worthy of a connoisseur beginning his weekly indulgences. This majestic start however is not maintained, for he then proceeds to tear it up and—horror of horrors!—throws it away by Monday. This is not the behaviour of an epicure but of a glutton, to be expected perhaps in a gormandiser but never in a gourmet.

My own colleagues differ in their approaches to this weekly feast. The senior staff work calmly through, starting with the Diary of the Week, while the recently qualified residents use it as a missile or club. Only in that shady half-world of the supernumeraries and registrars do we give the General Advertiser pride of place, hopefully copying the details of suitable appointments on the back of an envelope, for not many of us rise to our own LANCETS.

I hope this view of the seamy side will not distress anybody.

* * *

Now the basic petrol ration has been withdrawn and our non-professional brethren have laid up their cars again, thoughts turn once more to other means of getting about with the least possible expenditure of energy. So it shouldn't surprise one to find a physiologist[1] investigating the best position for a bicycle seat. Using a stationary cycle, and measuring oxygen consumption with the Douglas bag to estimate the energy output in performing a standard piece of work, he finds there are two optimum seat positions. One is the conventional position, which was developed fairly early in the evolution of the modern bicycle. The other is 63° behind the vertical through the pedal axle and is not far from the position of the seat in a child's pedal car. Provided the saddle has a low back to push against this is (just) the most efficient arrangement of all. It is used with success in the French racing velocar, and towards the end of the war was adopted in the little pedal-buggies in which, sitting side by side, mother and father propelled the family around Paris on a Sunday afternoon.

* * *

If I had a literary flair I should write a sequel to de Quincey's masterpiece, called *Confessions of a Membership Candidate*. The clinical picture, with its delusions and hallucinations, is characteristic. When going to an examination you feel that you have got both the day and the place wrong. You confirm them several times by looking at your notification from the examiners. You are sure your watch is an hour slow and that you will be late. If possible you check your watch and all the clocks in the house by the Greenwich time signal. Nihilistic feelings may be prominent. You wish you could melt away and vanish into the ground, and that the examiner would suffer the same fate. Then, of course, there is the psychosomatic aspect. In Edinburgh the ordeal is concentrated into just a week. I had the feeling that if it had lasted any longer I should have perforated or ended up with ulcerative colitis. However, the situation was not without irony. When I was half-way through, Messrs. Plum and Co. favoured me with a piece of blotting-paper advertising their admirable petroleum emulsion. A noble gesture, I thought, and exquisitely timed; inspired no doubt by the desire to pour oil on troubled waters.

* * *

I have been abstracting a paper in English on streptomycin trials in an Athens sanatorium. The author is enthusiastic about the remarkable improvement shown in the radiograms—so obvious that "the most claiming and difficult reader can be satisfied." But he adds, "if there is still any doubt, we think we can repeat to all who are hesitating the reply: 'An evil and adulterous generation seeketh after a sign and there shall no sign be given to it but the sign of the prophet Jonas.'" I racked my brains to think of the relevance of this quotation. Was it that a cavity was involved both in tuberculosis and in the whale? But it seems that the author merely means that if you, dear reader, won't believe him, others will.

* * *

Speaking as a wife—and there's little opportunity to be anything else in British Guiana—it's not a bad thing to live in a hospital compound. Ours, in one of the farthest corners of the Empire, is furnished with a plentiful supply of coloured labour. You want a stamp? A porter will cycle to the post office. The electric iron has gone funny? The hospital electrician works in sight of the house. A wheel has come off the pram? The engineer is here before you can say scalpel. A picture frame needs mending? The carpenter is more than willing. A toy needs painting? What's the painter for? You want a chicken killed or a lettuce planted? The gardener will spring to action. The car is in a mess? The handyman knows *all* about cars. What with all these and a cook-general, a nannie, a scrubber, and a laundress, and only three in family, there isn't really a lot for me to do, which explains why, after only a year in the colony, I have managed to find time to write this.

1. Hugh-Jones, P. *J. Physiol.* 1947, **106**, 186.

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Letters to the Editor

COMPENSATION VERSUS RESETTLEMENT

SIR,—Last year there came under my care a middle-aged man who had sustained at his work many and serious injuries. It was early apparent that he would never return to his old employment and the advantages of the Disabled Persons Register were explained to him. He was interested and entirely coöperative. The necessary steps were taken. In due course he made a substantial recovery and arrangements were made for him to go to a Ministry of Labour rehabilitation centre, to be trained for a new job while continuing to receive weekly compensation at the full rate. He was still willing and anxious to be trained.

Now there has been formed an unholy alliance between his trade-union and the employer's insurance company to wreck all the good that has been done. The trade-union, living in the past, has told him that under no circumstance is he to submit to being trained until he has received a lump-sum settlement, for if as the result of his training he achieves employment the lump sum will be smaller than if he hangs around and makes no effort. The insurance company support this view, telling the man the same tale and urging him to accept some figure quickly, because if he gets better the sum will diminish.

All surgeons who deal with industrial accidents welcomed the initiation of the Disabled Persons Register as a big step forward in the resettlement of the injured. The failure of the workmen's lay advisers to appreciate the true value of the scheme and their obstruction to its working seem to me to demand some publicity, for though this is a particularly glaring case it does not stand alone. Men more slightly injured, able and willing to go on working while still under treatment, repeatedly state that their trade-union advises against such a course for fear of jeopardising their compensation.

London, W.1. CECIL FLEMMING.

EARLY RISING AFTER OPERATION

SIR,—I found your leading article on Sept. 20 very interesting. Beginning in 1939, my patients as a rule have been out of bed no later than the second day after operation, and for the past two years on the evening of operation.

Your comment that patients actually hate it, even if the seductive words of the enthusiastic surgeon and his "decoy" patients have convinced them of its feasibility, is quite foreign to my experience. Since reading the editorial I have questioned a number of patients, at periods varying from two days to two months after operation. Without exception they have been enthusiastic about it, and those who had previously been operated and kept in bed for the conventional period were loud in their praises of early rising. On several occasions, through oversight, orders for early rising were not written, and patients have asked why they were not being permitted to be out of bed like the other patients they had seen. This showed no fear or dislike of the routine.

Certainly, early rising is foreign to surgical custom, and almost barbarous; but I am sure that once one breaks the spell of tradition, one will never return to prolonged bed rest.

Buffalo, New York. JOHN BURKE.

RENAL CIRCULATION

SIR,—In your account (Nov. 1) of the meeting of the section of experimental medicine of the Royal Society of Medicine on Oct. 21, Dr. Heggie is reported to have stated that by his findings "he had indicated to the workers in Oxford [Trueta, Barclay, Franklin, Daniel, Prichard] that the short circuit they had discovered and demonstrated in vivo was via these juxtamedullary glomeruli."

Neither of us, who opened the discussion, have any recollection of a statement by Dr. Heggie to this effect, and, in point of fact, it is entirely incorrect. As part of the demonstration at the Physiological Society, on June 15, 1946 (reported in the proceedings of the society), we exhibited photographs and photomicrographs of kidneys that "incline us to believe that the by-passing is effected, at least in part, via the vasa recta." We demonstrated vasa recta with their loops arising from glomeruli at the base of the cortex and, at that time, called them basal glomeruli. A preliminary communication of this demonstration appeared in THE LANCET of Aug. 17, 1946, and Dr. Heggie wrote to THE LANCET about this communication on Sept. 21. This was the first we had heard of his beautiful work on the structure of the glomeruli, and it was this work that he demonstrated at the recent meeting at the Royal Society of Medicine.

Your reporter states that Dr. Heggie had named these structures as juxtamedullary glomeruli in 1941, but Dr. Heggie did not refer to this at the meeting, nor have we seen any reference to this publication. After his letter in THE LANCET we forthwith adopted the name "juxtamedullary" and attributed it to him in our book (*Studies of the Renal Circulation*, p. 51); but to suggest that Dr. Heggie's work has guided us to our conclusion is entirely contrary to facts.

Nuffield Institute for Medical Research, Oxford. J. TRUETA
A. E. BARCLAY.

MALARIA TRANSMITTED BY BLOOD-TRANSFUSION

SIR,—With reference to the article by Dr. Rogers (Nov. 8), I would like to put on record the following case.

In 1943 a woman was admitted from a maternity hospital in Hertfordshire to the Hertford County Hospital with a diagnosis of puerperal fever. Swabs and blood-culture, however, proved negative, and it was only after several days that a full blood-count was requested. On doing the differential count I found, to my surprise, a number of tertian parasites, and subsequently, if my memory serves me well, the following history was obtained from the patient.

She felt well before, but had a severe hæmorrhage post partum, for which 3 pints of blood were given. Shortly after the second transfusion the patient had a rigor. All bottles were pooled blood supplied from a transfusion centre, and identification numbers had been destroyed. The patient had never been abroad, but as there were anopheles in that district and as the donors could not be traced, no definite proof could be obtained for the evidence of transfusion malaria and the case was never published. Prof. S. P. Bedson, then sector pathologist, informed the Ministry, and I believe it was Dr. Banks who investigated this case further.

I am not sure whether Dr. Banks's personal communication to the author of the article does not refer to the above case.

General Hospital and Infirmary, South Shields. K. S. RODEN
Pathologist.

COAGULATION FACTORS

SIR,—The letter from Professor Seegers (Nov. 1) raises several important issues which arise more or less directly from the interpretation of the results obtained by the one-stage and the two-stage methods for determining prothrombin. In both methods it was originally assumed that a unitary substance, prothrombin, was converted by thromboplastin and calcium to thrombin. To account for the difference of prothrombin activity obtained by the two methods, especially when measuring the level in various species, Warner, Brinkhous, and Smith [1] postulated a variation in the convertibility of prothrombin—"an element of species specificity."

With my discovery that the loss of prothrombin activity in stored human plasma could be corrected by adding fresh dog or rabbit plasma treated with $Al(OH)_3$,[2] it became apparent that a principle hitherto unrecognised was also essential for the formation of thrombin. At no time did I propose that there were two prothrombins, but I postulated that prothrombin was a complex composed of several components. Originally I called the principle which disappears on storage "component A"; but later study led me to re-designate it as the "labile factor" [3] and to apply the term "component A" to

1. Warner, E. D., Brinkhous, K. M., Smith, H. P. *Proc. Soc. exp. Biol., N.Y.* 1936, **40**, 197.
2. Quick, A. J. *Amer. J. Physiol.* 1943, **140**, 212.
3. Quick, A. J. *Lancet*, Sept. 13, p. 379; *Amer. J. Physiol.* (in the press).

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the principle that is deficient in one type of congenital hypoprothrombinæmia which I recently described.[3] The term "component B" remains reserved for the factor which is diminished in dicoumarol poisoning and in the first type of congenital hypoprothrombinæmia which I reported.[4] Terms such as "accelerator" were intentionally avoided to prevent confusion with thromboplastin. The concentration of the labile factor varies greatly in different species; it is abundant in dog blood and low in human blood. It appears likely that it was this factor that was lacking in the patient of Rhoads and Fitz-Hugh,[5] the first reported case of idiopathic hypoprothrombinæmia, and also in Owren's[6] case (although it is for Dr. Owren to make the final decision).

The one-stage method, by estimating the composite prothrombin activity of blood, has become increasingly valuable clinically and has in addition yielded much scientific information. The two-stage method is now employed relatively seldom for clinical purposes because it is rather complicated technically and because it yields perplexing results in certain conditions—as for example in early infancy.[7] Dr. Seegers's expression "the more reliable two-stage method for measuring prothrombin activity" must be considered as relative. In his type of investigation with the use of purified reagents it has yielded valuable results, and every worker in the field is appreciative of Dr. Seegers's contributions. Unfortunately the problem of hæmostatic dysfunction cannot yet be bodily transferred to the test-tube. Much information must still be sought by a direct study of blood, and for this purpose the one-stage method has proved its value by the test of time.

At present both approaches are still necessary, and the two types of effort should complement each other rather than antagonise. Ultimately it will likely be found that much of the present confusion is one of terminology rather than of basic facts.

Marquette University School of Medicine, Milwaukee, Wisconsin. ARMAND J. QUICK.

THE BARBITURATES

SIR,—Your leading article of Oct. 18 was most timely, and will cause many to reflect. In your issue of the following week Dr. G. Thurston wrote protesting that "it would be impossible for a busy doctor to see, say, every week all his patients who took phenobarbitone." May I suggest a simpler mode of caution? State upon the prescription that the supplies are to be issued weekly to the patient.

Minsterworth, Gloucester. S. P. VENABLES.

"JUGGED HAIR"

SIR,—On the cover of the July 27, 1946, *British Medical Journal* appeared in large print "Vinesthene Anæsthesia for Repair of Hair-lip and Cleft Palate." I expected to see some apology for this mis-spelling or at least a letter from some wag cleverly pulling the leg of the editor who had allowed it to pass him. Either it went unnoticed or I overlooked reference to it in subsequent issues of the journal.

In the Oct. 18 *Lancet*, p. 588, in an annotation I read: ". . . since the feeding of a child with a double hair-lip is at best tedious, . . ." In the three issues since that date I have seen no correction of this mis-spelling.

It is perhaps to be expected that a surgeon who receives a great many letters about this condition from parents and general practitioners should have come across this mistake frequently, but it seems odd that the editors of our two leading medical journals should have allowed it to pass. For twenty years or more I have refused to use the term at all; and I and those who have worked with me have adopted the terminology "cleft lip" first suggested, I believe, by Ritchie, of St. Paul, Minnesota—more descriptive, less inapt and less likely to lead to incorrect spelling.

Nuffield Department of Plastic Surgery, Churchill Hospital, Oxford. T. POMFRET KILNER.

4. Quick, A. J. *Amer. J. lab. clin. Med.* 1946, 31, 79.
5. Rhoads, J. E., Fitz-Hugh, T. jun. *Amer. J. med. Sci.* 1941, 202, 662.
6. Owren, P. A. *Lancet*, 1947, i, 446.
7. Brinkhous, K. M., Smith, H. P., Warner, E. D. *Amer. J. med. Sci.* 1937, 193, 475.

TEACHING APPOINTMENTS

SIR,—In your leading article (Oct. 25) dealing with Dr. Clark-Kennedy's new textbook you state: "He has concluded that medicine is in serious danger from the dominance of specialism. Increasingly narrow specialists are not the best people to control the teaching of the undergraduate student."

The importance of this is not generally realised, and few seem to appreciate what is happening in most of the teaching schools. Several recently appointed professors of medicine are primarily not clinicians but physiologists or workers in some other branch of research; and this tendency has spread to recent appointments of readers and senior lecturers.

Knowledge of general medicine, clinical experience, ability to lecture, enthusiasm and flare for teaching—these apparently are of little consequence. Research-workers are dominating the teaching schools and obtaining most of the full-time teaching appointments; and research-workers are often bad clinicians and poor teachers. From personal experience and the opinions of interested friends, I know that the teaching of medicine to undergraduates in many schools is of poor quality; and the much-boosted and advertised postgraduate teaching is often worse. M.R.C.P.

RUPTURE OF THE SPLEEN

SIR,—I should like to call attention to the leucocytosis with relative and absolute decrease of lymphocytes in the case reported by Dr. Druitt (Nov. 1). This condition of the blood is found with traumatic rupture of spleen, according to Bieri,[1] and it is therefore a useful sign in establishing the diagnosis.

Institute for Morbid Anatomy, University of Bratislava, Czechoslovakia. F. KLEIN.

EFFECT OF BENADRYL ON GASTRIC ACIDITY

SIR,—Mr. Doran's letter of Sept. 27 is an important contribution in that it demonstrates that anti-histamine drugs are probably bad treatment for hyperacidity, and in that it helps to uncover a very significant physiological fact. The conclusion however that his results "throw some doubt on the hypothesis that the ultimate stimulus to the parietal cells is normally histamine" may be challenged.

The position is briefly this. Histamine is widely regarded as the physiological stimulus for acid gastric secretion. Certain drugs have been proved to exert an anti-histamine action, and from quantitative studies it is concluded that this action is in the nature of substrate competition. It was thus natural to attempt to reduce gastric acidity by the administration of these drugs, but these attempts have not only failed but often actually resulted in increased acid gastric secretion. From this paradoxical result Doran concludes that histamine may after all not be the physiological stimulus of acid gastric secretion.

This conclusion overlooks the fact that if histamine were unconcerned with acid gastric secretion the administration of anti-histamine drugs should make no difference either way. Doran's line of thought, followed to its logical end, would lead to the conclusion that histamine is actually an inhibitor of acid secretion—a view which seems untenable in the present state of our knowledge.

Assuming that the histamine theory of acid gastric secretion is correct, we must conclude from the above experiments that the administration of anti-histamine drugs led in these cases to an increased supply of histamine to the gastric mucosa. Now, if we accept the idea that these drugs act by substrate competition, then their administration must, ceteris paribus, lead to an increase of circulating histamine by an equivalent amount, as the drug interferes with the fixation of histamine to the H-sensitive cells. This excess could, however, have no influence on the acid gastric secretion unless the mechanism by which histamine affects the parietal cells of the gastric mucosa is different from that by which it produces its effects in other tissues, and such that it is either less or not at all interfered with by the anti-histamine drugs.

1. Bieri, J. *Schweiz. med. Wschr.* 1946, p. 1053.

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The hypothesis that the action of histamine on the gastric mucosa is different from its action elsewhere seems reasonable because in the stomach it has a specific function to perform, whereas in most other sites its action is general and (with normal amounts in normal individuals) feeble. It is well known that many active metabolites, while they have a feeble general effect, have a pronounced action on special organs; and it must be assumed that in these instances two different mechanisms are at work. Thus, with an even concentration in the blood, gonadotrophic hormones act chiefly on the gonads, gonadal hormones chiefly on the secondary sexual organs, and thyrotrophic hormone chiefly, though not exclusively, on the thyroid gland.

An analysis of the present situation leads to the following conclusions:

1. There is strong evidence that histamine is a physiological stimulus for acid gastric secretion.
2. There is strong evidence that administration of "antihistamine" drugs increases acid gastric secretion.
3. It seems therefore probable that the action of histamine on the gastric mucosa is a specific one—i.e., different from its action on other tissues.
4. This conclusion is in accordance with the known facts about the action of many other active metabolites (hormones, vitamins, enzymes).

Far from throwing doubt on the histamine theory of acid gastric secretion, Doran's results may be evidence in favour of it, indicating as they may a specific reactivity of the gastric mucosa to histamine.

Surgeons' Hall, Edinburgh. ERICH GEIRINGER.

URETHANE IN CHRONIC MYELOID LEUKÆMIA

SIR,—The question whether urethane can prevent relapses in chronic myeloid leukæmia cannot be answered with certainty, though Paterson and her co-workers [1] state that it cannot do so. Equally, it is still uncertain whether severe damage to the hæmopoietic tissues is attributable to urethane, though Paterson et al. mention a case in which there were signs of aplasia, perhaps due to urethane. Davidson [2] refers to toxic effects but does not specify their nature.

No report has been published of chronic myeloid leukæmia treated continuously for long periods with urethane; and for this reason the present cases are placed on record.

CASE 1.—A woman, aged 26, had been diagnosed as having chronic myeloid leukæmia in 1942, but was free from symptoms until about August, 1945.

When I first saw her in October, 1945, she complained of bouts of sickness, fatigue, occasional fever, and increasing size of her waist. Her spleen extended below the umbilicus, and there was extreme tenderness on pressure over the lower part of the sternum. The leucocyte-count was 200,000 per c.mm. (with the usual differential count of chronic myeloid leukæmia) and there were 340,000 platelets per c.mm.

She was given X-ray treatment by Dr. Russell Reynolds, and by the end of December, 1945, the number of leucocytes had fallen to 14,200 per c.mm., with few myelocytes present.

By April, 1946, the leucocyte-count had again risen to 71,000 per c.mm., and the spleen, which had almost retired to the costal margin, was again below the umbilicus. The patient again had X-ray treatment and improved, but on Aug. 16, 1946, the leucocyte-count was 78,000 per c.mm., the lower sternum was tender, and the spleen reached the umbilicus.

She was now given enteric-coated capsules of urethane (Martindale) 0·5 g. thrice daily. A month later the spleen was half-way between the costal margin and the navel, the sternum was not tender, and the leucocyte-count was 46,000 per c.mm.

The patient continued to take urethane, and in January, 1947, the leucocyte-count was 6250 per c.mm. Urethane was continued in spite of the diminished white-cell count, and shortly afterwards the patient found that she was pregnant. Even so, the same dose of urethane was continued, and in May, 1947, when the leucocyte-count had risen to 21,500 per c.mm., the dose was increased to four capsules (2 g.) daily. This was continued throughout the pregnancy until, on Aug. 30, Mr. Leslie Williams performed a cæsarean section.

The baby appeared perfectly healthy, its neonatal blood picture was within normal limits, and it has gained weight steadily during the first month of life. The mother can feed the child and appears to be in excellent health. The breast-milk contained less than 15 mg. of urethane per 100 ml.

Urethane was only stopped for a few days after the operation, during a slight urinary infection, but three days after the birth the leucocyte-count was only 18,000 per c.mm.

The mother and child remain in good health (a month after the cæsarean section) and the total amount of urethane taken up to that time was nearly 900 g.

No signs of toxicity have been noted, and as yet there are no signs of a relapse, though the blood picture is, of course, not normal.

CASE 2.—A woman of 41, with a total leucocyte-count of 695,000 per c.mm., has had 300 g. of urethane in five months, with a resultant fall in the number of leucocytes to 104,000 per c.mm. Treatment is being continued.

CASE 3.—A woman of 67, with a spleen that would no longer respond to radiotherapy, has had 400 g. of urethane in nine months; and, as a result, the spleen has retired behind the costal margin.

My results in cases of chronic lymphatic leukæmia are far less satisfactory, and in acute leukæmia urethane has proved to be useless.

It seems possible that the toxic effects attributed to urethane may be due to its use as a method of producing the same sort of rapid improvement in the blood picture as can be obtained by radiotherapy. My experience in the cited cases (and in others) is that a moderate dose (in enteric-coated capsules to avoid nausea) produces a more gradual but equally spectacular improvement, and that a maintenance dose can be given to avoid relapses. If only in the last respect, urethane is more useful than radiotherapy, which has to be administered episodically.

Case 1 is not the only recorded example of a successful pregnancy in a leukæmic woman, but it is the only one in which urethane has been given throughout. Here again, urethane has a great advantage over X rays, which cannot safely be given during pregnancy for fear of damage to the child, whereas urethane is apparently innocuous to the fœtus.

London, W.1. A. PINEY.

1. Paterson, E. A., Thomas, I., Haddow, A., Watkinson, J. M. *Lancet*, 1946, i. 677.
2. Davidson, L. S. P. *Practitioner*, 1947, **159**, 315.

THE HEALTH OF AUTHORS

SIR,—In his delightful and refreshing lecture (Nov. 15), Mr. Harold Nicolson refers to A. E. Housman as displaying "plodding assiduity." This I find surprising, for in his preface to the first edition of *Last Poems* Housman writes: "I publish these poems, few though they are, because it is not likely that I shall ever be impelled to write much more. I can no longer expect to be revisited by the continuous excitement under which in the early months of 1895 I wrote the greater part of my other book, nor indeed could I well sustain it if it came." Surely these words suggest that with Housman, too, inspiration was an impulse.

London, N.14. ARNOLD BLOOM.

ESTIMATION OF RENAL ACTIVITY

SIR,—It seems that some of the statements in the article by Dr. Greiner and Professor Podhradszky, on Oct. 4, require comment.

They stated that "reduction in urinary flow is due to changes occurring simultaneously in glomerular and tubular functions, the latter, owing to their larger extent, being more important." On referring to fig. 3 we find that the tubular reabsorption *decreases*, during the thirsting phase, and that the reduction in urine flow is mainly due to a reduction of filtration-rate. The values from fig. 3 (*a*) are: glomerular filtration-rate 160, 145, 100, 128 c.cm. per min.; urine flow 10, 2·4, 0·5, 3·7 c.cm. per min.; and tubular reabsorption of water 150, 142·6, 99·5, 124·3 c.cm. per min.

It seems that the chloride clearance is used as an estimate of tubular function. Now when the tubular reabsorption is large, less work need be performed, in withdrawing a given amount of chloride from the tubule, than when the water reabsorption is less. This is obvious, since the reabsorbate in the former case will be less

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concentrated than in the latter, and it is difficult to see how a value like chloride clearance can act as an indication of "increased tubular function." It is more rational to regard concentrating power as an index. Where U is the urinary concentration of creatinine, P the plasma concentration of creatinine, and V the minute-volume of urine, the clearance, represented by UV/P, can remain the same although U rises.

In this connexion it is interesting that Barcley et al.[1] have suggested that the concentration ratio of creatinine can be used as an indication of renal function.

Department of Anatomy, Medical School, Birmingham, 15. DAVID F. COLE.

INFECTION FROM SPINAL ANÆSTHETIC

SIR,—It appears that almost all the cases of infection following spinal anæsthesia have been traced to contamination of the so-called sterile water used for washing out the needles and syringes. May one who, although not a professional anæsthetist, has given many hundreds of spinal anæsthetics, without incident so far, offer a word of advice?

Never use any "sterile water": there is always too much anæsthetic solution in the ampoule and this is always sterile. I attach the spinal needle to the syringe and draw up a little of the anæsthetic; this washes through the needle and can be shaken about in the barrel of the syringe. Apart from the mechanical wash-out, the introduction of this small amount of anæsthetic will use up anything present in the needle or syringe which might cause precipitation of the anæsthetising agent; in fact, this was my reason for adopting such a technique in the days when cocaine products, which are more easily affected in this way, were in more common use.

This simple technique avoids the need for using sterile water which, in my opinion, should always be regarded with suspicion.

Maternity Hospital, Kingshill, Swindon. GUY ROWORTH.

DEPERSONALISATION SYNDROME

SIR,—The article of Nov. 15 by Dr. Shorvon is of great importance. Psychiatrists and psychotherapists will benefit by the careful study of the cases reported there.

To my mind, the very features of the complaints in these patients distinguish them from psychoneurotics who are fit for analytical therapy. May I say that, apart from the early "enthusiastic" days of my practice, I should have recognised these cases as unlikely to react to the most skilful analytical therapy. Case 5 perhaps might have benefited by such treatment after the first attack, in having had less proneness to react with depersonalisation, even though one ought not to be sure about this. But in general it is unjustifiable to spend much time and money on a prolonged experiment of psycho-analysis in cases of the type referred to in Shorvon's publication. The rare cases of depersonalisation which did improve by psycho-analysis (I know of only two) showed a different character and development.

This, however, does not imply that this syndrome is always quasi-psychotic and not a disturbance of psycho-affective processes. The few cases which yielded to ether abreaction do suggest that the feeling of unreality may be a pure psychoneurotic manifestation, even though not of the type that reacts to the ordinary analytical approach.

London, W.1. S. LOWY.

LANCETS ON LOAN

Prof. K. Thomas, dean of the medical faculty of the University of Erlangen, writes to say that for some time past he has been receiving copies of THE LANCET regularly. Professor Thomas has been unable to trace where the packets come from, but he and the other members of the faculty, with whom he shares them, would like to thank the unknown donor. Though many periodicals are available in the American library at Erlangen they cannot be taken away on loan, and, as Professor Thomas remarks, "Wer von uns hat schon tagsüber die Zeit sich in die Bibliothek zu setzen?" He and his colleagues are therefore all the more grateful to the anonymous LANCET-lender.

1. Barclay, J. A., Kenney, R. A., Cooke, W. T. *Nature, Lond.* 1947, 160, 432.

Parliament

FROM THE PRESS GALLERY

Medical Practitioners and Pharmacists Bill

IN moving the second reading of this Bill in the Upper House on Nov. 11, Lord HENDERSON said its object was to dispose finally of the war-time problems associated with the admission to the British Medical Register of doctors not possessing British qualifications. After briefly describing its main provisions[1] he added that when temporary registration ceased there were about 3500 names on the temporary register. This figure included many American and Canadian doctors, and of the others —Germans, Austrians, Poles, and Czechs—many had returned to their own countries. It was estimated that not more than 1500–2000, including the Polish doctors who had come to this country under the Polish resettlement scheme, would avail themselves of the Bill.

The Bill also provided for the registration—in the first instance on a provisional basis—of certain doctors who are not on the temporary register. This power, Lord Henderson emphasised, was limited to doctors who were in this country when the Bill was introduced. Neither in this Bill nor in our war-time measures, he thought, had we treated foreign doctors ungenerously, but we must put some limit on the relaxation of ordinary procedure. Permanent modification of the present law—which makes the registration of foreign doctors dependent on reciprocity—would be beyond the scope of the Bill.

Only clause 8 in part I of the Bill, therefore, would be permanent. Its intention was to regularise the position of doctors visiting this country for a limited period, either as teachers or as postgraduate students. Many of these visitors were not eligible for registration under the Act of 1886, and technically it was a professional offence for a registered practitioner to coöperate in professional work with an unregistered person. These doctors were at present also unable to give statutory certificates or to possess or supply dangerous drugs. It was true that in the past no legal difficulties had arisen, but the risk had been there, and the Government thought it should be removed, especially as in the near future hospitals would become a State responsibility. Registration under this provision would be temporary and would only be given for the duration of and in respect of specific appointments. The Bill would give the General Medical Council the necessary powers in regard to these doctors. The council, he added, were the guardians of the standards of medical education in this country and we could safely leave to them the task, which might not prove easy, of assessing the value of the great variety of medical diplomas held by applicants under the Bill.

Though Lord LLEWELLIN welcomed the Bill, "for we are not overflush with doctors at present," he stressed the medical profession's satisfaction that the Government, since the Bill was first introduced, had limited eligibility for registration to doctors already in this country on Aug. 4, 1947. Lord HARLECH supported the Bill because it sought to break down the idea that all the doctors from one country should be recognised and allowed to practise here and that none of the doctors from other countries should be recognised. Recognition, he held, ought to be personal and should depend on whether a man was properly qualified. He hoped to see the day come when there would be more interchange of medical experience, medical research-workers, and medical practice between all the countries in the world.

QUESTION TIME

How Many Calories?

Major E. A. H. LEGGE-BOURKE asked the Minister of Food how the daily calorie content of the weekly minimum amount of food regarded as necessary for an unemployed man, as decided by the Ministry of Health in coöperation with the British Medical Association in 1933, compared with that of the present ration after the reductions recently announced by the Government.—Mr. J. STRACHEY replied: The calorie value of the no. 2 diet suggested for an adult man by the British Medical Association in 1933 was 3386 calories daily. As announced by the Minister of Economic Affairs, the recent

1. See *Lancet*, Nov. 8, p. 703.

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reduction in distribution will result in an estimated average daily calorie intake of just below 2700 per head for the whole population. Major LEGGE-BOURKE: Is the Minister aware that his reply will cause considerable concern in the country, and can he say whether the figure of 2700 calories quoted by the Minister of Economic Affairs took into consideration the recent cut in potatoes?—Mr. STRACHEY: Yes, sir; it did take into consideration the rationing of potatoes. I cannot agree that there was a ration figure for the unemployed before the war, but I entirely agree that the level of calories which I have just quoted is a matter of grave concern.

Mr. SOMERVILLE HASTINGS: Is it not a fact that many people engaged in sedentary work are not now taking in 2700 calories a day?—Mr. STRACHEY: Yes, sir. The figure of 2700 is the average figure. There are many sections of the population getting very much more; therefore there are many who are getting much less. Mr. J. S. C. REID: How many calories are represented by the cut caused by potato rationing?—Mr. STRACHEY: Seventy.

Replying to a further question, Mr. Strachey gave the following calorie values for the rationed foods (not including eggs or pointed foods) of a normal adult:

Meat	117	Sugar	123
Bacon	15	Bread	648
Cheese	33	Milk	102
Butter	61	Preserves ..	41
Margarine ..	124		
Lard	36		1300

Calories for Industrial Workers

Lieut.-Colonel U. CORBETT asked the Minister what was the calorie value of the rations available to the following categories of workers taking account of basic rations, extra rations, and canteen rations: miners, workers in factories having canteens, farm workers, and other working men.—Dr. E. SUMMERSKILL replied: Assuming that a worker takes five main meals and five hot beverages a week at his canteen, the average calorie value of his basic rations, including points and sweets and the rations provided through the canteen, would be 3370 calories a head daily for a miner, and 2530–2630 for an industrial worker, depending on the type of canteen available. Agricultural workers' rations provide 2600 calories a head daily. Other workers get amounts which depend on the nature of their work, and the provision of canteens.

Rations for Hospital Patients

Mr. H. W. BUTCHER asked the Minister whether the patients in hospitals and nursing-homes would suffer the recently announced cut in civilian rations.—Mr. STRACHEY replied: Residents in hospitals and nursing-homes are entitled to the same rations as the domestic consumer. Additional foods considered necessary on medical grounds may be obtained in the same way as for people suffering from similar complaints at home. Special cuts of 15% or 17½% in the allowances of various rationed and controlled goods to certain catering establishments made because of the crisis were not applied to residents in catering establishments or anyone in institutions.—Mr. BUTCHER: While bearing in mind the fact that persons in these institutions have no access to public canteens, or other methods of feeding out, is the Minister really satisfied that the ration these people will receive will be adequate to restore them to good health?—Mr. STRACHEY: That was why we did not apply the recent catering establishment cut to these places.

Health and Nutrition Surveys

Mr. BUTCHER asked the Minister whether, in view of the reduced rations, he would arrange for frequent surveys of the health and nutrition of the civilian population and for the publications of the reports of such surveys.—Mr. STRACHEY replied: Surveys of health are the responsibility of the Ministry of Health, but the Ministry of Food has been carrying out a monthly survey of food consumed in the home since 1941, and will continue to do so. A report on the survey results from 1941 to 1946 is now being prepared for publication. Ad-hoc surveys are also arranged to investigate current problems and difficulties.

National Health Service

Sir E. GRAHAM-LITTLE asked the Minister of Health if he would now give an estimate of the number of general practitioners and specialists, respectively, which would be required to warrant putting into operation the National Health Service Act, 1946, now proposed to take place in July, 1948; and what measures had been taken to provide additional hospital accommodation, health centres, and other buildings required to carry out the provisions of the Act.—Mr. A. BEVAN replied: The National Health Service will be brought into operation with the resources available at the appointed day. These resources will be extended as circumstances permit.

Obituary

WALTER ROWLEY BRISTOW

M.B. LOND., F.R.C.S.

Rowley Bristow's influence as orthopædic surgeon to St. Thomas's Hospital and as orthopædic consultant to the Army will long continue through his power as a leader and teacher of young men.

Born in 1882, the son of Henry Joseph Bristow, of Bexley, Kent, he began his medical studies at St. Thomas's, where he won renown not only as a prize-winner but as a member of the soccer, lawn-tennis, and water-polo teams, and later as a scratch golfer and the owner of a series of sporting motor-cars. In 1907 he took the Conjoint qualification, and the following year his M.B. After holding house-appointments at the hospital he obtained his surgical fellowship in 1909, and when war broke out in 1914 he was already established in consulting practice as a traumatic surgeon. With the Middlesex Yeomanry he served in Gallipoli and was mentioned in despatches for his work at Suvla Bay. In 1916 he returned to England to work at Shepherd's Bush military hospital with Sir Robert Jones. Here he quickly became Sir Robert Jones's disciple and friend, for they shared the same vigour of body, ability of mind, and generosity of character. After the war their association continued, for in 1919 St. Thomas's set up an orthopædic department with Sir Robert as its titular head and Bristow as his active assistant. When Bristow retired from the staff early this year a tribute in the hospital gazette acclaimed him as in fact from the start the real director of this department. "Though he was a loyal and ardent admirer of Robert Jones, he proved no slavish follower of the Liverpool school. His organising ability and his happy knack of picking good assistants and getting good work out of them soon established the new venture on a sound footing." But his affectionate respect for his old chief continued, and it was appropriately recognised by his election last year to give the Robert Jones lecture of the Royal College of Surgeons, when he spoke on injuries of the peripheral nerves. With his work at St. Thomas's he combined his surgical directorship of the St. Nicholas Hospital for Cripples at Pyrford, to the advantage of both. He was also on the consulting staff of the King Edward VII Hospital for Officers at Osborne.

When war came again in 1939 Bristow was appointed orthopædic consultant to an E.M.S. area, but in the following year he became orthopædic consultant to the Army, and in 1941 he was made consulting surgeon in orthopædics to the Army, with the rank of brigadier. In the course of his duty he flew many thousands of miles across the Atlantic and over the Mediterranean and Middle East. He was largely responsible for the establishment of orthopædics as a specialty in the Army, and the Service gained immeasurably from his choice and direction of young surgeons, from whom he demanded something of his own whole-hearted efficiency. They gave of their best for the work itself and in loyalty to their leader.

Bristow's colleagues at home trusted him fully, and he was president of the British Orthopædic Association in 1937. He was also elected to the orthopædic associa-

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tions of America, France, and Belgium, and last year he was appointed chevalier of the Legion of Honour, and awarded the Croix de Guerre with palm. Of his international relations a Canadian surgeon says: "To see the many visitors from the United States and Canada come to his doorstep, whether mature orthopædic surgeons or not, to wonder, marvel, and then remain to learn, was a never-ending pleasure. Here was a man to warm the cockles of the hardest transatlantic heart, with his straightforwardness, his singleness of purpose, his cutting of the inevitable red tape, his brilliance, and his conciseness of thought and dynamic action. Some of us discovered his kind affection and his pleasure in all things beautiful. Those of us who visited him at his home, where he fondly and proudly displayed his alpine flowers, his herbaceous border, and his fruit and vegetable garden, and talked quietly with him by his fireside, could appreciate the greatness of the man and the loving-kindness in his heart which he hid behind his somewhat austere and brusque exterior. We, who had the privilege of working with him, have had our moments of difficulties, always of our own making, and at a later stage have appreciated his mature advice and wise guidance. No more will we be affectionately greeted, with the pungent remark that so often went home, by the man with the sparkle in his eye, whom we came to love, admire, and respect."

As C. M. P. puts it, Bristow "possessed the happy knack of getting loyal coöperation from all his assistants. Outside his professional work he was keen on many forms of sport: above average as a player of ball games, he continued to be a good golfer till a few months before his death; lately his main interest had been in fishing and shooting. He thoroughly enjoyed the social occasion and showed both generosity and discrimination in his entertainments both at home or in his club. He lived his life to the full and with good courage."

"It is difficult to believe," writes H. P., "that Walter Bristow has gone from our midst whilst still at the height of his powers. For to his colleagues, his pupils, and his friends—in many different walks of life, all over the world—he seemed invulnerable. We had looked forward to his enjoyment of a long Indian summer, in which some of us, both young and old, might have continued to share his radiant spirit. In his genius for friendship, and in the ideal setting of his home and family life, we have lost something which is irreplaceable. By the death of Walter Bristow, international orthopædic surgery loses one of its outstanding leaders, and we mourn the passing of a master surgeon."

We conclude by quoting part of a tribute from G. R. G.: "My long friendship with Rowley Bristow," he says, "has been to me a source of great happiness, and valued even more because all the time I have been learning from those things he taught by example to all who were with him—to get at the facts, to keep one's feet on the ground, and to master one's methods. It is human to make mistakes, and he was very human, yet probably he made as few mistakes as any man. This, I think, was due to his essential humility, shown by his eagerness to learn from juniors and seniors alike provided they could give their proofs. We shall miss him as a man of outstanding character, with a genius for life and friendship, and above all else a most heartening presence."

Mr. Bristow married in 1910 Florence, only daughter of James White, LL.D., and they had one son and two daughters. He died in London on Nov. 10.

WALTER KING HUNTER

M.D., D.SC., LL.D. GLASG., F.R.F.P.S.

Prof. W. K. Hunter, who died on Nov. 7 at the age of 80, was one of the most distinguished physicians of his generation in Scotland. The active years of his life were spent in the service of Glasgow Royal Infirmary, where he was in turn student, house-physician, and a member of the visiting staff until he retired in 1934. From 1903 until his appointment to the newly instituted Muirhead chair of medicine in 1911, he was lecturer in the practice of medicine at Queen Margaret College.

After leaving the Glasgow Academy, Hunter entered the faculties of science and medicine at the university, graduating B.SC. in 1888 and M.B. in 1890. Seven years later he obtained the degree of M.D., and in 1901 that of D.SC. On his retirement from his chair the university conferred on him the honorary degree of LL.D. A fellow of the Royal Faculty of Physicians and Surgeons, he held various offices in the faculty, including examinerships in medicine for the licence and for the fellowship. In his younger days Hunter was on the staff of the Glasgow Royal Hospital for Sick Children, and it was a great satisfaction to him to serve in later years on the board of governors. He was also for many years consulting physician to Glasgow Royal Mental Hospital. He was one of the foundation members of the Association of Physicians of Great Britain and Ireland, and he also took an active part in the work of the local medical societies, holding various offices, including that of president of the Glasgow Royal Medico-Chirurgical Society.

Hunter's years of postgraduate study on the Continent, when he visited the neurological clinics of the Paris hospitals, laid the foundations of a life-long study of neurological problems which he combined with a keen interest in hæmatology. His work in these two subjects formed the basis of a number of publications, including a small monograph on the anæmias, and he contributed to our columns (1904–06) a series of papers on the action of snake venoms on the nervous system.

"Hunter was not an easy man to know," writes J. N. C. "His rather formal speech and mannerisms tended to give a false impression. Perhaps his most characteristic trait was a horror of overstatement and of flamboyance in speech, behaviour, and dress. What is now called 'shooting a line' was abhorrent to him. But to the man who was interested in learning clinical medicine, his teaching was an inspiration and his equanimity an example. Uncle Walter, as he was called by generations of students, will long be remembered with the late W. R. Jack, John M. Cowan, John McKenzie Anderson, and others happily still with us, who carried on the clinical tradition of the Auld Hoose. One of the secrets of Hunter's happiness was the variety of his interests. He was deeply read in general as well as in medical literature. His appreciation of music, poetry, and painting was founded on a real knowledge of these arts and he was devoted to quiet rural pursuits. All these were elements in the background of a busy life spent in the service of the community."

Births, Marriages, and Deaths

BIRTHS

BARTHOLOMEW.—On Nov. 10, at Bath, the wife of Dr. N.I. Bartholomew—a son.

DENNY.—On Nov. 11, at Plymouth, the wife of Surgeon Lieut.-Commander G. C. Denny, R.N.—a daughter.

HARGROVE.—On Nov. 11, at Wokingham, Berks, the wife of Dr. Peter Hargrove—a son.

MASON.—On Nov. 9, at Aylesbury, the wife of Flight-Lieutenant J. K. Mason, R.A.F.—a son.

PIKE.—On Nov. 6, in London, the wife of Dr. Charles Pike—a daughter.

SOUTHERN.—On Nov. 10, in London, the wife of Dr. E. M. Southern—a daughter.

MARRIAGES

GAVOURIN—THOMSON.—On Nov. 3, at Guildford, H. S. Gavourin, M.B., lieutenant, R.A.M.C., to "Terry" Thomson.

MCCORMACK—JONES.—On Nov. 13, Robert John Murray McCormack, M.B., to Gwyneth Avarina Jones.

OSMOND—MCKENZIE.—On Nov. 12, at Milford, Surrey, Humphry Fortescue Osmond, M.R.C.S., surgeon lieutenant, R.N., to Amy Edith McKenzie.

WAKELIN—ELLIS.—On Nov. 12, at Copthorne, Sussex, John Wakelin, M.R.C.S., to Joan Ellis.

DEATHS

DICKINSON.—On Nov. 15, at Eastbourne, William Henry Dickinson, M.B. Edin., lieut.-colonel, I.M.S. retd.

FAWCETT.—On Nov. 8, at Harrogate, Herbert Fawcett, M.A. Camb., L.S.A., aged 77.

FRASER.—On Nov. 9, at Fittleworth, Sussex, Margaret Helen Fraser, M.B. Lond., aged 75.

HINGSTON.—On Oct. 14, James Clarence Ledeatt Hingston, M.R.C.S., D.P.H., colonel, R.A.M.C. retd., aged 65.

O'DONNELL.—On Nov. 10, at Ledbury, Sir Thomas Joseph O'Donnell, K.C.I.E., C.B., D.S.O., L.R.C.P.I., major-general, A.M.S. retd., aged 89.

RITCHIE.—On Nov. 8, at Dunedin, New Zealand, Russell Ian Ritchie, M.B., M.R.C.O.G.

SHEA.—On Nov. 12, at Royston, Henry Francis Shea, D.S.O., M.B. Durh., colonel, R.A.M.C. retd., aged 75.

WINDER.—On Nov. 12, James Herbert Roche Winder, D.S.O., B.A., M.D. Dubl., lieut.-colonel, R.A.M.C. retd.

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Notes and News

PURCHASE-TAX ON DRUGS

THE British Medical Association has sent to the Ministry of Health a strong protest against the increase of purchase-tax on many classes of drugs which is proposed in the Budget. "It is impossible," the association says, "for any doctor with the interests of his patients at heart to view other than with grave concern any measure which increases the cost of sickness, or adds to the anxiety which accompanies illness. Many of the drugs affected by the increase of purchase-tax are in constant use. The association feels bound to point out that a substantial increase in the cost of these medicines is bound to be reflected in increased cost of medical services which will fall most heavily on the chronic sick, to whom perhaps more than any other sections of the community, this additional burden will cause hardship. The association urges that a reconsideration be given to this question."

LONDON MEDICAL EXHIBITION

THIS year's London Medical Exhibition, held at the hall of the Royal Horticultural Society, missed the splendour of last year's display when all the war-time advances were on show for the first time. There were, however, some interesting novelties. One was an electrical device whereby up to twelve students can listen simultaneously through stethoscopes to heart or breath sounds; selectivity is acute, and the apparatus should find a place both in teaching and in diagnostic work, particularly with obese subjects. Many surgical-instrument manufacturers are finding it hard to keep pace with orders. In part this is due to sales overseas, where the demand is great and still growing; but basically the cause is shortage of skilled labour. Apprentices, usually reserved during the war, are now called up; and in any case young men commonly prefer to engage in less skilled but better-paid employment, such as machine-minding, rather than undertake the long apprenticeship required before they can qualify as artisans in this field.

SCHOLARSHIPS IN AID OF SCIENTIFIC RESEARCH

THE council of the British Medical Association is prepared to receive applications for research scholarships as follows: an Ernest Hart scholarship (£200 p.a.), a Walter Dixon scholarship (£200 p.a.), and four research scholarships (each £150 p.a.). These scholarships are given to candidates qualified to undertake research in any subject (including State medicine) relating to the causation, prevention, or treatment of disease. In addition, applications are invited for the first award of the Insole scholarship (£250 p.a.) for research into the causes and cure of venereal disease. Preference will be given to doctors. Each scholarship is tenable for one year commencing on Oct. 1, 1948. The scholar, who may be reappointed for not more than two additional terms, is not necessarily required to devote the whole of his or her time to the work of research, but may hold an appointment at a university, medical school, or hospital, provided the duties of such an appointment do not interfere with work as a scholar. Applications must be made not later than April 30, 1948, on the prescribed form, which may be obtained from the secretary of the association, B.M.A. House, Tavistock Square, London, W.C.1.

NEW FILMS

SOME new films shown at the Ministry of Health on Oct. 30 set a high standard of technical finish, and deliver their messages well.

Patent Ductus Arteriosus is a beautifully made record of an operation for closure of the ductus carried out at Hillingdon Hospital. The effects of this anomaly on the heart and circulation are well illustrated by animated drawings, the stages of the operation are clearly shown, and the commentary is particularly good. It should prove valuable as a reminder to general practitioners that this formerly hopeless type of congenital heart disease can now be perfectly cured.

The film was made by the Crown Film Unit, and is now to be issued by the Central Office of Information at the request of the Ministry of Health, for showing to medical audiences. Copies will shortly be available in 35 mm. and 16 mm. (sound) sizes from the Central Film Library, Imperial Institute, South Kensington, London, S.W.7. The running time is 27 minutes.

The Prevention of Tuberculosis in Hospitals is an American film, running for 22 minutes, and showing a very well-organised scheme for routine miniature radiography of all patients attending a general hospital. Dr. Peter Kerley, in introducing it, noted that the incidence of tuberculosis in American hospital patients seems to be rather higher than the supposed rate here. Nevertheless, the precaution of routine radiological examination is well worth taking, and this film reveals many important details of management, besides showing how films can be developed, examined, and stored with the least possible waste of time for everybody concerned.

A one-minute film—*Diphtheria Trailer No. 10*—now being shown in cinemas at the end of news-reels brings home the immunisation lesson in a tiny animated cartoon which manages to be amusing without being frivolous, and telling without being alarming. It was made by the Central Office of Information (Halas & Batchelor Cartoon Films Ltd.) at the request of the Ministry of Health.

Your Children's Meals, the fifth film in the "Your Children" series, is for showing to general audiences, and runs 13½ minutes. It teaches a great deal about the management of meal times, the types of food that children fancy, and the ways in which sensible and sociable parents can get their children to be sensible and sociable too. The cutting of the film is clever, the sequences amusing as well as informative, and the standard of photography good. As usual the children act themselves with uncanny skill.

The film has been made by the Central Office of Information (Central Film Unit) for the Ministry of Health, and copies will soon be available in 35 mm. and 16 mm. (sound) sizes from the Central Film Library. Arrangements can be made for the film to be shown through the Central Office of Information mobile film units, on application to the Film Officer at the appropriate C.O.I. Regional Office (addresses from the C.O.I. Films Division, 83, Baker Street, London, W.1).

HOSPITAL FOR CHILDREN IN GERMANY

AT a meeting of the Save the Children Fund held in London on Nov. 6, Dr. Cyril Elgood described the work of the fund's hospital at Schlutup in Schleswig-Holstein where he is superintendent. The building, formerly the administrative block of a German war-time factory, has room for about 100 children, who come from the neighbouring camps for displaced persons. The staff includes 10 English nurses, and Dr. Elgood also trains displaced persons to help with the nursing. The stocks of penicillin for the whole area are in his charge, but they do not suffice to meet the need; for military supplies are not available for children, and German hospitals have none. The address of the fund is 20, Gordon Square, London, W.C.1.

AUSTRALIAN CHAPEL OF REMEMBRANCE AT HAREFIELD

DURING the 1914–18 war No. 1 Australian General Hospital was stationed at Harefield, and the patients received many kindnesses from the residents. Over 100 Australian soldiers and sailors are buried in the churchyard, where a service of remembrance is still held on Anzac Day. There are thus ties between Harefield and many Australian homes, and this has led to the desire to convert a chapel in the old church at Harefield into an Australian Chapel of Remembrance which will commemorate both world wars. An executive committee has been formed and is asking for £5000 for this purpose. Contributions from English friends will be welcome but the appeal is primarily addressed to Australians resident in Britain, and especially those who were with the Australian Imperial Forces in the first world war. Donations should be sent to Major N. Keith Bushell, c/o the National Bank of Scotland, 18–20, Lower Regent Street, London, S.W.1.

University of Birmingham

Dr. Harold Scarborough has been appointed a lecturer in the department of medicine.

Dr. Scarborough graduated M.B. with honours at Edinburgh in 1932 and later took his PH.D. He became M.R.C.P.E. in 1940 and F.R.C.P.E. this year, while in 1941 he was elected to the fellowship of the Royal Society of Edinburgh. Dr. Scarborough held a succession of teaching and research appointments first at Edinburgh and for the last two years as a Beit fellow with Prof. G. W. Pickering at St. Mary's Hospital, London. At present he holds a Rockefeller fellowship and is working in Prof. E. M. Landi's department at Harvard. His research interests have been devoted to the problems of ascorbic acid and vitamin P, while recently he has been investigating certain aspects of peripheral blood-flow.

Royal College of Physicians of Ireland

On Nov. 7 the following were admitted to the membership: T. J. Ryan, J. W. Magner, Max Millard, G. A. C. Miller.

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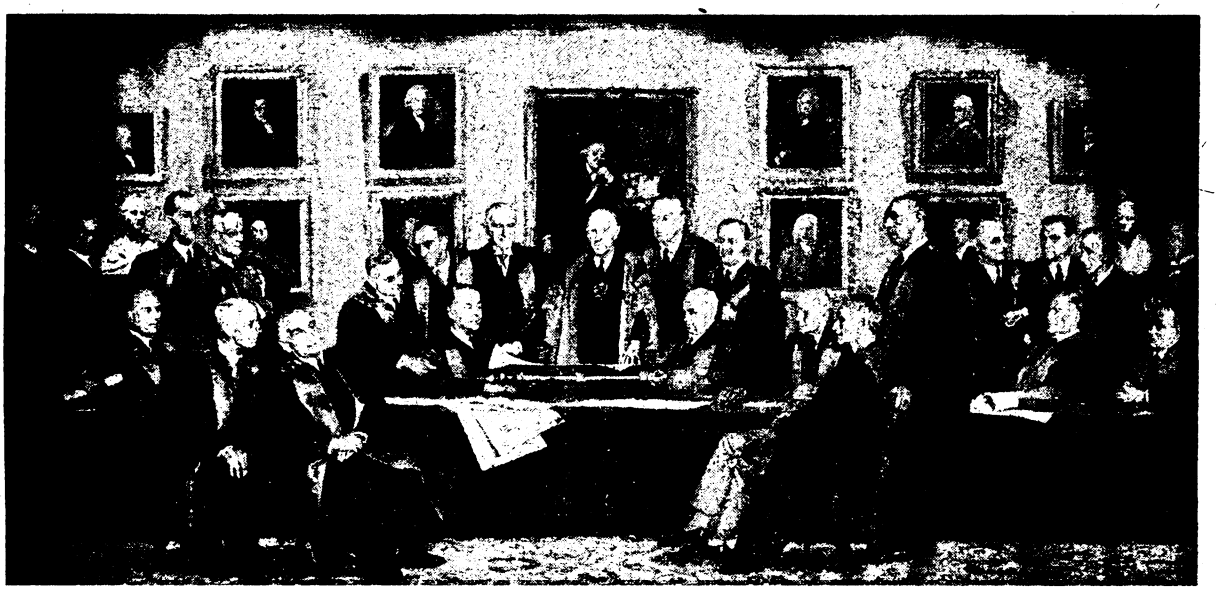

A painting by Mr. Henry Carr of the council of the Royal College of Surgeons of England for 1946–47, presented to Sir Alfred Webb-Johnson, the president, at a dinner held at the college on Nov. 13 in honour of Sir Alfred and Lady Webb-Johnson.

In front of the table, standing, from left to right: Sir Hugh Cairns, Mr. Philip Mitchiner.
Sitting, from left to right: Mr. L. E. C. Norbury, Mr. Zachary Cope, Mr. Geoffrey Keynes.
Behind table, standing, from left to right: Mr. Tudor Edwards, Sir Max Page, Prof. Ernest Finch, Mr. McNeill Love, Sir Reginald Watson-Jones, Prof. A. H. Burgess, the President, Mr. Henry Souttar, Prof. Harry Platt, Mr. Julian Taylor, Prof. Lambert Rogers, Prof. G. Grey Turner, Sir Gordon Gordon-Taylor.
Sitting, from left to right: Prof. Paterson Ross, Sir Heneage Ogilvie, Sir Cecil Wakeley, Sir James Walton, Prof. R. J. Willan, Mr. Scott Mason.

University of Manchester

Mr. Victor Lambert has been appointed as professor of otolaryngology.

After graduating M.B. at the University of Manchester in 1923, Mr. Lambert was admitted F.R.C.S.E. in 1927. He took his M.CH. in 1932 and his M.D. in 1940. Since 1935 he has been lecturer in diseases of the ear at Manchester University, and he is also consulting otologist to the department of education of the deaf, aurist and laryngologist to the Manchester Dental Hospital, and assistant lecturer in physiology. Mr. Lambert also holds appointments as aural surgeon to the Manchester Royal Infirmary, the Christie Hospital, and the Royal Manchester College of Music. He has published original work on diseases of the larynx, and has taken a particular interest in comparative anatomy.

Dr. Michael Polanyi, F.R.S., professor of physical chemistry in the university, has been appointed to the chair of social studies.

Professor Polanyi graduated in medicine in the University of Budapest. Later he specialised in chemistry and he held the chair of chemistry in the Technical High School of Berlin, and taught in the Kaiser Wilhelm Institute, publishing original work on crystal structure and chemical reaction kinetics. In 1933 he accepted an invitation to become professor of physical chemistry at Manchester. His wide experience and range of interests have brought him closely into contact with investigators and teachers in social studies and in economics, and he is the author of *The Contempt of Freedom* and *Full Employment and Free Trade*. He was elected a fellow of the Royal Society in 1944, and in 1946 delivered the Riddell lectures in the University of Durham on Science, Faith, and Society. His Lloyd Roberts lecture on the Foundations of Academic Freedom was published in our columns this year.

Queen's University, Belfast

Dr. A. C. Stevenson has been appointed to the chair of social and preventive medicine.

Dr. Stevenson, who is 38, was educated at Glasgow Academy and Glasgow University, where he took the degrees of B.SC. in 1930 and M.B. in 1933. After holding house-appointments at the Glasgow Royal Infirmary he became resident medical officer at Highgate Hospital, London. In 1935 he took his M.R.C.P. and two years later his D.P.H. while serving as assistant M.O.H. for Wakefield. In the same year he was appointed deputy M.O.H. for the borough. From 1939 to 1945 he served with the R.A.M.C. as assistant director of hygiene, West African command, and as deputy director of hygiene, Western Command. At the beginning of 1946 he was appointed to his present post of reader in the University of London at the London School of Hygiene.

Mr. H. W. Rodgers has been appointed to the chair of surgery.

Mr. Rodgers, who is 39 years of age, was educated at King's College School and St. Bartholomew's Hospital, where he took the Conjoint qualification in 1931, and the F.R.C.S. two years later. After holding house-appointments at Barts and clinical assistantships at St. Mark's and St. Peter's Hospital he became chief assistant to a surgical unit at Barts, and afterwards was appointed to the staff as assistant surgeon. He is also surgeon to the Radium Institute and Mount Vernon Hospital, and he holds the honorary rank of lieut.-colonel in the R.A.M.C. He has published articles on gastroscopy and diseases of the stomach, some of them being written in collaboration with Mr. N. C. Tanner and Dr. F. Avery Jones. Mr. Rodgers delivered a Hunterian lecture at the Royal College of Surgeons in 1938 on Gastroscopy, and in 1947 on the Late Results of Gunshot Wounds of the Abdomen. He has also published reports for the Army on gas-gangrene and abdominal wounds. He was appointed O.B.E. in 1943.

Royal College of Surgeons of England

At a meeting of the council of the college held on Nov. 13, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. James Wyatt was admitted as a coöpted member. Mr. V. E. Negus, Sir Stewart Duke-Elder, Mr. F. C. Ormerod, Mr. F. W. Law, and Mr. George Black were admitted as members of the court of examiners. Mr. H. S. Souttar was appointed Hunterian orator and Mr. L. E. C. Norbury Bradshaw lecturer.

The following were elected fellows in dental surgery:

Sir Frank Colyer, Prof. E. C. Sprawson, Colonel E. B. Dowsett, Mr. Frank Coleman, Mr. T. W. Widdowson, Mr. F. N. Doubleday, Mr. J. H. Badcock, Mr. W. Warwick James, Mr. J. G. Turner, Mrs. Lilian Lindsay, Mr. A. E. Rowlett, Mr. Bryan J. Wood, Mr. C. S. Morris, Mr. Harold Round, Brigadier R. A. Broderick, Mr. J. Sim Wallace.

It was decided to institute courses of postgraduate lectures on dental subjects. Dr. F. S. Gorrill was appointed anatomical curator and lecturer in anatomy. Dr. B. Schofield was appointed lecturer in physiology. Leverhulme scholarships were awarded to Mr. E. S. R. Hughes and Mr. H. Daintree Johnson.

Diplomas of membership were granted to the candidates named in THE LANCET of Nov. 8 (p. 707) as having qualified to practise, and to D. J. Parr and J. C. E. Pougher. Diplomas in child health, medical radiodiagnosis, medical radiotherapy, and physical medicine were granted, jointly with the Royal College of Physicians, to the candidates named in THE LANCET of Nov. 8 (p. 707). The D.M.R. was also granted to D. K. Sambrook.

Society and the Individual

On Thursday, Dec. 4, the British Social Hygiene Council will hold a conference on this subject in the Livingstone Hall, Tothill Street, Westminster, S.W.1. The chair will be taken by Prof. Winifred Cullis, D.SC., and Dr. E. B. Strauss, and the speakers will include Mr. Kenneth Walker, F.R.C.S., and Dr. E. H. Larkin. Tickets may be had from the council, Tavistock House North, W.C.1.

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Central Midwives Board

Mr. R. J. Fenney, previously assistant secretary, has been appointed secretary and chief executive officer of the board, in succession to Mr. A. J. Bennett, who has been appointed secretary to the North-west Metropolitan regional hospital board.

University of Leeds Postgraduate Committee

Clinical meetings, open to general practitioners, will be held at 3.15 P.M. on Tuesdays, beginning on Jan. 6, in the instructional block, Leeds General Infirmary. No fee will be charged, and further information may be had from the senior administrative officer, School of Medicine, Leeds, 2.

Institute of Dermatology, London

Two alterations have been made in the lecture programme for December and January, which appeared in our advertisement columns last week. On Dec. 4 Dr. R. T. Brain will give a lecture on Filtrable Viruses, and on Jan. 14 Dr. C. W. McKenny will speak on X-ray Technique.

Spens Committees

Sir Horace Hamilton, G.C.B., has been appointed a member of these committees, which are considering the range of professional income of consultants and specialists, and of dental practitioners, in a publicly organised health service. Sir Horace, who was Permanent Under-secretary of State for Scotland from 1937 until 1946, succeeds Sir Thomas Gardiner.

Royal Society

A Royal medal has been awarded to Dr. F. M. Burnet, F.R.S., for his work on bacteriophages, viruses, and immunity, and for his contributions to the study of infectious diseases as an ecological phenomenon. The Buchanan medal has been awarded to Sir Edward Mellanby, F.R.S., for his researches on the physiology of nutrition, especially in relation to the causation of deficiency diseases.

Scottish Triple Qualification

The following have been admitted licentiates of the Royal Colleges of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow:

Afolabi Alakija, J. M. Brownlie, Leo Charles, W. J. C. Colin-Thome, R. S. Cowie, A. M. Darwish, T. P. Edwards, P. H. T. Fok, Sidney Gordon, J. A. Gray, W. S. Hall, Maurice Harris, Patricia E. Hartley, J. M. Hillock, Emanuel Katz, D. P. Keith, Stanley Lipson, Michael Lloyd-Jones, Peter Macpherson, Hilary E. C. Millar, H. G. C. Payne, A. I. Richardson, J. R. Scott, Joan C. R. Shiell, Harry Simmons, H. S. Sloane, J. D. Stewart.

The latest monograph of the Queckett Microscopical Club, *Illuminants and Illumination for Microscopical Work*, comprises a lecture delivered by Mr. F. E. J. Ockenden. The monograph, price 2*s.* 6*d.*, is published for the club by Messrs. Williams and Norgate Ltd., 36, Great Russell Street, London, W.C.1.

YEARBOOK OF PHYSICAL ANTHROPOLOGY.—A new number of this yearbook will shortly be available, and requests for copies, for which there is no charge, will be met as far as possible. Those who would like to be considered for a copy of this new edition or who still wish a copy of the first number, which covered 1945 (*Lancet*, 1947, i, 684), should apply to Dr. J. M. Tanner, Department of Human Anatomy, University Museum, Oxford.

Appointments

BOTTOMLEY, JANET, M.D. Lond., F.R.C.S., M.R.C.O.G.: first assistant and registrar, gynæcological and obstetric department, London Hospital.

BOURDILLON, J. F., B.M. Oxfd, F.R.C.S.: senior registrar, orthopædic and fracture department, Addenbrooke's Hospital, Cambridge.

KEMP, T. A., M.B. Camb.: asst. physician, St. Mary's Hospital, London.

NASH, D. F. E., F.R.C.S.: asst. surgeon, St. Bartholomew's Hospital, London.

PILCHER, M. F., M.B. Lond.: orthopædic registrar, Hospital for Sick Children, Great Ormond Street, London.

THOMPSON, WALTER, M.B. Leeds, F.R.C.S.: chief assistant to a surgical unit, Manchester Royal Infirmary.

London County Council Hospital Service:

CATTERALL, R. C. F., M.CHIR. Camb., F.R.C.S.: surgeon specialist.

METCALFE, R. H., M.A., M.D., M.CHIR. Camb., F.R.C.S.: surgeon specialist.

THOMAS, R. G., M.B. Lond., F.R.C.S.E.: asst. surgeon specialist.

Diary of the Week

NOV. 23 TO 29

Monday, 24th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Mr. S. Mottershead: Blood-supply of the Hindgut.
5 P.M. Prof. R. J. S. McDowall: Shock.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Odontology.* Miss E. M. Knowles: Survey of Dental Condition of Children in Day Nurseries and Residential War-time Nurseries.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Mr. E. W. Riches, Mr. W. Somerville Mack, Mr. Ronald Reid: Tumours of the Bladder.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
6 P.M. Mr. Geoffrey Gateman: Cinematograph films on Organic Disorders of the Larynx and on Bronchial Neoplasms by Dr. Paul Holinger.

ILLUMINATED ENGINEERING SOCIETY
6 P.M. (2, Savoy Hill, W.C.2.) Prof. Hamilton Hartridge, F.R.S.: Physiology of Vision.

Tuesday, 25th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. J. Whillis: Anatomy of the Œsophagus.
5 P.M. Dr. F. C. Courtice: Oxygen and Carbon-dioxide Transport.

ROYAL SOCIETY OF MEDICINE
8 P.M. *Medicine.* Sir Allen Daley: Acute Anterior Poliomyelitis. Dr. Margaret Macpherson: Atypical Primary Tuberculous Lesions. Dr. J. E. Capes: Use of Tubular Blockade in Penicillin Therapy.

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. I. Muende: Pathological demonstration.

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Dr. J. L. Henderson: The Child's Inheritance.

Wednesday, 26th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Mr. R. J. Last: Segmental Innervation of Limb Musculature.
5 P.M. Prof. A. C. Frazer: Fat Metabolism.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Endocrinology.* Prof. H. L. Sheehan, Dr. A. W. Spence, Dr. Russell Fraser, Dr. S. L. Simpson: Simmonds's Disease.

INSTITUTE OF LARYNGOLOGY
11 A.M. Prof. T. Pomfret Kilner: Plastic Surgery.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. Mary Sheridan: Hygiene in the Nursery and Play-room.

Thursday, 27th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. John Kirk: Fœtal Circulation.
5 P.M. Dr. D. J. Bell: Carbohydrate Metabolism.

SOCIETY OF MEDICAL OFFICERS OF HEALTH
5.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Sir Allen Daley: My American Diary.

MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1.) Dr. W. R. H. Heddy: Death on the Roads.

HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Prof. J. Chassar Moir: November 1847 and its Sequel.

Friday, 28th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. P. R. Peacock: Experimental Study of Breast Cancer.
5 P.M. Dr. L. E. Glynn: Hepatic Dysfunction.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Pædiatrics.* Dr. Ian Skottowe, Dr. A. A. E. Newth, Dr. Mildred Creak: Child Guidance in the New Health Service.

LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. Shirley Smith: Acute Heart-failure.

MIDDLESEX COUNTY MEDICAL SOCIETY
2.45 P.M. (Royal National Orthopædic Hospital, Stanmore.) Mr. John Cholmeley: Management of Anterior Poliomyelitis—Early and Late. Dr. J. O. F. Davies: Epidemiology of Anterior Poliomyelitis.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH
5 P.M. Dr. R. M. Stewart: Clinical Features and Pathological Anatomy of Infantile Hemiplegia. (Morison lecture.)

Saturday, 29th

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, W.1
2.30 P.M. Dr. Eric Wittkower: Psychological Aspects of Venereal Disease.

CORRIGENDUM: *Thorium-X.*—The correct reference to Mr. Henry Corsi's papers (mentioned by Dr. Carleton and Dr. Whittle in their letter last week) is *Lancet*, 1943, ii, 346.

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A HEPATIC SYNDROME OF WIDE DISTRIBUTION

ILLUSTRATED BY LESIONS IN MALARIA AND BLACKWATER FEVER

BRIAN MAEGRAITH M.B. Adelaide, M.A., D. Phil. Oxfd
W. H. HORNER ANDREWS M.A., B.M. Oxfd
DAVID GALL B.M. Oxfd

From the Department of Tropical Medicine, Liverpool School of Tropical Medicine

CLINICAL manifestations of liver disease may appear in all forms of human malaria at any stage. They are most common in *P. falciparum* infections, and extreme examples present the syndrome of bilious remittent fever in which the liver is enlarged and tender, jaundice appears early, associated with either the indirect or biphasic van den Bergh reaction, and there is bilious vomiting with severe and often intractable diarrhœa. Bilirubin is usually, but not always, present in the urine (Manson-Bahr 1945, Fairley 1932–33). A clinical picture very similar to bilious remittent fever sometimes develops in blackwater fever.

Henry (1932) maintains that the liver is always affected in malaria, but this view is not widely accepted. Nevertheless in uncomplicated malaria there may be enlargement of the liver with some jaundice and other signs of liver disturbance, including deviations in serial hepatic-function tests and the passage in the urine of bilirubin, urobilin, and urobilinogen (Rudolf 1927, Kern and Norris 1944, Hughes and Bomford 1944, Kean and Smith 1944, Kopp and Solomon 1943, Mirsky et al. 1944, O'Leary et al. 1929, Lippincott et al. 1945, 1946, Fredricks and Hoffbauer 1945, Carter and MacLagan 1946, Glenn et al. 1946).

LIVER CHANGES IN MALARIA AND BLACKWATER FEVER

In active malaria associated with deviations in hepatic-function tests liver-biopsies have occasionally been performed and have revealed no evidence of structural alterations (Fredricks and Hoffbauer 1945). In fatal cases, however, important pathological changes are often observed.

At necropsy after acute malaria the liver is usually enlarged and varies from dark red to black according to the amount of pigment present. The cut surface bleeds easily and is often fatty. Occasionally there are small hæmorrhages in the central regions of the lobules.

The histological picture is one of central zonal degeneration and necrosis. The lobules are indistinctly demarcated. The congested organ shows the central vein and its tributary sinuses filled with erythrocytes, many of which contain parasites. When anæmia is severe, the central vein and sinuses appear dilated and empty. There is little evidence of stasis or thrombosis in the blood-vessels, whose endothelium is not much affected.

Some writers have recorded "mechanical obstruction" of the sinuses and occasionally of the larger blood-vessels by collections of pigmented macrophages, free parasites, and pigment; stasis; thrombosis; and agglutination of erythrocytes, some containing parasites. Such obstruction appears to be rare. Klotz (1929), for instance, found no evidence of it in patients who died of malignant tertian malaria in West Africa, and he stated that, so far as vascular occlusion was concerned, the picture in the liver in *P. falciparum* infections was "nothing like" that in the brain.

The Kuppfer cells and the littoral cells of the sinuses are often grossly swollen and filled with erythrocytes, parasites, and debris. These swollen cells appear in places to obstruct the lumen of the sinuses. The columns of polygonal cells are often widely separated and appear to be distorted and pushed apart by the hypertrophied Kuppfer cells.

The polygonal cells contain hæmosiderin but not malarial pigment. They may show only mild acidophilic granular degenerative changes, but fatty degeneration is common and is most evident in the cells of the central zone of the lobule or, when these cells are necrotic, in the cells at the periphery. More severe degeneration and necrosis have often been reported in human and animal malaria and in blackwater fever.

Klotz (1929) has provided one of the clearest descriptions of the liver lesions. In patients who died of *P. falciparum* infections the appearance of the cut surface of the liver was one of "reversed nutmeg details," the lobules showing a yellowish-grey centre and a peripheral red zone. Necrosis of the liver cells was found in the inner two-thirds of the lobule and was most prominent in those cells surrounding the central vein. In this region the cytoplasm was granular, vacuolated, fatty, and acidophilic, and the nuclei stained feebly or were pyknotic, broken up, or absent. The necrosis was sharply limited, and the cells at the periphery of the lobule were relatively unaffected. The central veins and sinusoids were deeply congested. Klotz believed this dilatation was very significant and developed before the changes in the hepatic cells.

Similar changes have been observed by other workers in human and simian malaria (Rigdon and Stratman Thomas 1942, Kean and Smith 1944, Taliaferro and Cannon 1936, Taliaferro and Mulligan 1937, Gaskell and Millar 1920, Dudgeon and Clarke 1919).

Some degree of atrophy of the polygonal cells is also commonly seen in malaria. Gaskell and Millar (1920), for instance, described "rows of shrunken cells" in the central zone of the lobule. The atrophic cells show reduction of cytoplasm, which is often fragmented, and some minor changes in the nuclei.

In severe malaria and blackwater fever the bile in the gall-bladder is tarry and inspissated, and the liver cells may show evidence of biliary obstruction, with the canaliculi distended with greenish bile. These cellular changes are again most prominent in the central zone of the lobule. Occasionally, even in the presence of severe central necrosis, there may be no apparent biliary changes (Whipple 1909, Dudgeon 1920, Paterni 1923, Klotz 1929).

Cellular infiltration of Glisson's capsule has been described, especially in cases with a history of long-sustained or frequently recurring attacks of malaria. The cells are lymphocytic in type and do not usually invade the cells of the lobules. They are confined as a rule to the region of the portal vessels.

PATHOGENESIS OF CENTRAL-ZONE HEPATIC NECROSIS

Vascular Changes

The hepatic lesions in malaria in many ways resemble those developing in right-sided heart-failure, associated with tissue anoxia arising from interference with the escape of venous blood from the liver. In a few cases of malaria the effects of a failing heart probably contribute towards the pathological changes in the liver (Gaskell and Millar 1920), but in most cases almost identical liver lesions appear without any evidence of cardiac failure. This is especially true of blackwater fever, in which liver lesions are very common and cardiac failure is rare except as a strictly terminal event. Some patients in whom liver lesions are well developed die in a state resembling shock (Atchley 1930), a condition in which right-heart failure does not occur and indeed the venous return to the heart is much reduced; hence "back-pressure" effects originating in the vena cava cannot play any part in the production of the liver changes (Wiggers 1918, Mann 1919, Moon 1938, Rigdon 1942, Maegraith 1944). The similarity of the lesions

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of shock to those of "passive" congestion in the liver as well as other organs has been emphasised by Moon (1938).

Some explanation other than right-sided heart-failure must therefore be sought to explain the hepatic lesions in most cases of malaria and blackwater fever. The congestion and dilatation of the lobular vessels may result from obstruction to the blood-flow arising from changes in the vessels themselves. The blood-flow through the vessels may be to some extent inhibited by: (1) intravascular agglutination of red cells, which occurs, however, only late in the disease; (2) stasis or thrombosis, of which there is very little firm evidence (stasis might be expected to follow changes in the endothelium leading to increased permeability, but in the liver the endothelial cells are physiologically so permeable that no further appreciable local loss of fluid takes place even when the cells are damaged); and (3) mechanical effects arising from hypertrophy, hyperplasia, and degeneration of the Kuppfer and littoral cells.

The balance of histological evidence indicates that these processes can affect the flow through the lobule only slightly. There must therefore be some other form of resistance to the venous flow, and this is most probably an active obstruction due to constriction of some elements of the hepatic venous vessels. Such constriction would reduce the hepatic venous outflow, and it is probably this reduction of venous flow and the associated anoxia arising from it which give rise to the hepatic lesions observed. The syndrome of Chiari (1899) illustrates well the effects of obstruction to the hepatic veins. Here the orifices of the larger veins are obstructed by thickening of the intima and sometimes suddenly by thrombosis. When the obstruction is acute, the cells of the central zone of the lobules are completely destroyed and there is intense congestion of the central vein and its tributary sinuses. In cases of more gradual development there is "extensive atrophy" of the hepatic cells in the centre of the lobule with distension of the central vein and sinuses. Thompson and Turnbull (1911) observed that in this syndrome there is a "remarkable association of a liver showing extreme atrophy with venous congestion with a heart in which there is no evidence of chronic embarrassment."

This picture is the same as that seen in malaria, in which there is neither constant cardiac failure nor any evidence of thrombosis or other anatomical occlusion of the hepatic veins. Since interference with the drainage of venous blood from the hepatic lobules arises somewhere between the lobule and the vena cava, there must be obstruction (presumably vascular constriction) in the hepatic venous tree.

Cellular Changes

The vascular changes discussed above lead to slowing of the intralobular circulation and to progressive stagnant anoxia (Peters and Van Slyke 1931) interfering with the oxygen supply to the tissue cells. Cellular damage arising from this anoxia is at first reversible, but finally becomes irreversible and goes on to degeneration and necrosis. This anoxia is probably the principal cause of the changes found in the liver cells, but there are contributory factors in malaria which aggravate the anoxia arising from the intralobular circulatory incompetence. The invasion of erythrocytes by the plasmodia leads to a lowering of the oxygen-carrying capacity of the infected cells, and the anoxæmia so produced is augmented by the anæmia arising from the destruction of both infested and non-infested cells. These general processes may be further enhanced in malaria, but not in blackwater fever, by the local tissue effects of diffusible products of the parasitic metabolism, such as pyruvic acid, lactic acid, and possibly other substances released at sporogony of the parasites. The malarial pigment is not involved (Anderson and Morrison 1942). In the production of the final picture of degeneration and necrosis other factors are also involved, including the nutritional status of the patient and the hypoproteinæmia prevailing in many cases.

It is possible also that the anoxic state of the hepatic tissue, or some change in it arising indirectly from the malarial infection, produces changes in the constituents of the cells and renders them auto-antigenic and capable of producing anti-liver-cell antibodies which react with the antigens and cause tissue damage. Gear (1946) has suggested that some process of this sort may be involved in the lysis of erythrocytes in malaria and has shown that the yellow-fever virus will produce auto-antigens in rhesus-monkey livers.

There is no need here to discuss these contributory factors in detail, since there is ample evidence to show that the essential factor in the cellular changes is anoxia resulting from alterations in intralobular blood circulation. It is not very easy to see, however, why the lesion should be centrally placed, since pure stagnant anoxia should affect all areas of the lobule equally. Possibly the depleted oxygen-carrying powers of the blood are concerned here, and the tissue at the periphery of the lobule, which receives the arterial blood first, has a better opportunity of securing its oxygen supply than that in the centre of the lobule. Specific sensitivity of the central cells to chemical poisons and some kind of collateral circulation between sinuses in the periphery of the lobule have also been suggested, without much supporting evidence.

MALARIA AS AN EXAMPLE OF A GENERAL PROCESS

We have seen that the hepatic lesions of malaria and blackwater fever are similar. In severe cases the picture is one of dilatation and possibly congestion of the central lobular veins and tributary sinuses. There is degeneration and necrosis of the polygonal cells of the central zone of the lobule, resulting, so far as can be judged, from anoxia arising mainly from obstruction to the venous outflow from the liver.

The conditions referred to above are clearly anoxic, but the central zonal necrosis often appears in circumstances which are not so obviously anoxic. For instance, it is not easy to see at first sight how anoxia could develop in chloroform or carbon-tetrachloride poisoning, except in the form of histotoxic anoxia arising from the direct action of the chemical agent on the tissue oxidation systems (Keilin 1925). The same difficulty arises in explaining the liver lesions in burns and many of the experimental procedures such as ligation of the portal vein or hepatic artery and the production of Eck's fistula. We believe that the only explanation can be that in all these conditions there is an alteration in the intrahepatic blood-flow which leads to stagnant anoxia. This still does not explain the central distribution of the degeneration, and it seems necessary to postulate also either some process whereby most of the oxygen of the blood is removed by the cells in the periphery of the lobules, such as we have mentioned elsewhere, or the shunting of blood away from the centre of the lobule so that the peripheral cells receive a better supply than those in the centre.

No particular specific agent has been implicated in the pathogenesis of the liver lesions in either malaria or blackwater fever. These lesions may therefore be regarded as examples of a general pathological reaction, the non-specific nature of which is emphasised by the wide variety of clinical conditions in which it occurs. Thus central lobular necrosis has been recorded in right-sided heart-failure; poisoning by various chemical agents, such as chloroform (Whipple and Sperry 1909); heat hyperpyrexia (Malamud et al. 1946); severe burns (Hartman and Romence 1943), especially after tanning (Wilson et al. 1938, Erb et al. 1943); acute postoperative

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necrosis of the liver (Sutton 1943); various allergic reactions; pernicious anæmia; secondary anæmias, including severe hæmorrhage; and babesia infections in dogs. Experimentally, similar lesions have been produced by the administration of various poisons, such as carbon tetrachloride and phosphorus (Williamson and Mann 1923), by long exposure of animals to low atmospheric oxygen tensions (Rosin 1928, Rich 1930), and on occasions but not always (Cameron and Mayes 1930) by interference with the blood-supply to the liver (Rous and Larimore 1920, Bainbridge and Leathes 1906–07, Behrend et al. 1922, Whipple and Hooper 1916).

The appearance of identical pathological changes in such diverse conditions indicates a common factor. It is our contention that the lesions develop primarily because of alterations in intrahepatic blood-flow, and that the cellular changes are brought about by localised anoxic conditions.

Rous and Larimore (1920) obtained central necrosis by ligating branches of the portal vein, and they considered it arose from venous "back pressure." They noted, however, that "atrophy is least at the periphery of the lobule where oxygenation is most." MacCallum (1928), Resnik and Keefer (1925–26), and Rich and Resnik (1926) studied the development of central zonal degeneration under various conditions and concluded that the basis of the lesion was deficient oxygenation of the blood, which progressively increased from the periphery to the centre of the lobule. Rich (1930) examined livers from many cases of anæmia and found central degeneration in all of them; dietetic factors had been excluded. He concluded that "atrophy and central necrosis will occur as the result of anoxæmia in the absence of heart-failure, and in the absence of any evidence of passive congestion of the heart, spleen, or other organs." Anoxia, therefore, whether due to anæmia, stagnant circulatory conditions (right-heart failure), or lowered oxygen tension in the respired air, will produce central zonal cellular changes in the lobules.

In the absence of right-heart failure, as we have seen in malaria, the stagnant anoxia in the liver probably arises from active obstruction to the venous outflow, which leads—for example, in Chiari's disease—to a centrally placed lobular lesion. We suggest that the obstruction to the venous outflow arises from constriction of some or all of the hepatic venous tree, and that this is the basic mechanism in the production of the lesions in the conditions referred to. (There is evidence that this may also be the case in heart-failure.)

Acute constriction of the hepatic veins in dogs is readily produced by anaphylactic shock (Simonds and Brandes 1927), the trigger dose giving rise to a rapid swelling of the liver, a fall in blood-pressure, and a diminution of venous return to the heart. The hepatic venous flow is greatly reduced. On section the vessels are found to be intensely congested, the maximal effect being on the central and tributary sinuses. Similar obstruction to the hepatic venous flow may be produced by histamine (Mautner and Pick 1929) and peptone (Simonds and Brandes 1929).

Bauer et al. (1932) obtained clear evidence, in perfusion experiments, of the existence of a "sphincter-like" mechanism which could regulate to some extent the venous outflow from the dog's liver. This "sphincter" could be activated by histamine and relaxed by stimulation of the sympathetic nerves to the liver or by small doses of adrenaline. It was located near the caval ostia of the hepatic veins. Physiological evidence of a similar "sphincter" has not been obtained in man, but there is some anatomical evidence suggesting that the musculature of the larger hepatic veins may be specialised to act as sphincter. If such a hepatic venous sphincter does exist in man it presumably reacts to shock and histamine by constriction, which would explain the hepatic lesions of, for example, algid malaria and blackwater fever. There may be constriction of any part of the venous tree, including small vessels like the sublobular veins, or large vessels like the hepatic veins, or even the hepatic vena cava.

Deysach (1941) has brought forward evidence for the existence of "sluice vessels" which drain directly from the sinusoids into the sublobular veins; these were present in all mammals, independent of the degree of musculature of the hepatic veins, and their constriction impeded venous drainage.

The mechanism of the reflex is still highly speculative. Since the classical experiments of Francois-Franck and Hallon (1896) and Burton Opitz (1911–14) many observers have studied the effects of nerve stimulation and of adrenaline on the liver, both in situ (Griffith and Emery 1930, Edmunds 1915) and perfused (McMichael 1932, Bauer et al. 1932). The consensus of opinion is that both adrenaline and stimulation of the sympathetic nerves cause a diminished inflow of blood coupled with an increased outflow (see Franklin 1937). Bauer et al. (1932) go further and find that, whereas large doses of adrenaline reduce the outflow, smaller doses hasten it. Large doses of adrenaline lead to hepatic engorgement (Bainbridge and Trevan 1915) and even to central necrosis (Drummond 1904). Histamine (Baer and Rössler 1927, Mautner and Pick 1929), peptone, anaphylactic shock, and digitalis (Katz et al. 1938) all diminish the outflow from the liver of dogs. The effect of acetylcholine and of vagal stimulation is equivocal, no great change usually being noted; diminished outflow has, however, occasionally been recorded. Adrenaline reverses the effect of histamine and of peptone.

As we pointed out above, in the dog the ostia of the hepatic veins are surrounded by a thick coat of smooth muscle which appears in induced shock to be the primary factor in restricting the venous outflow (Arey and Simonds 1920). No such localised thickening of the venous wall is found in man, though Elias and Feller (1931) report that the smooth muscle present is capable of raising folds in the intimal wall. The smaller venous tributaries are, however, well supplied with muscle, and various observers believe that resistance to venous outflow may also take place in these vessels (Bauer et al. 1932, Mautner and Pick 1929, Baer and Rössler 1927).

The initiation of the vascular changes in the liver is probably reflex in origin. In general states, such as shock, the reflex may be initiated by extrahepatic stimulation and represent part of a generalised, possibly protective, mechanism designed to restrict the blood-flow through the viscera. It is interesting to note here the frequent association of renal and hepatic changes. Possibly the so-called hepatorenal syndrome has its origin in such reflex activity, whereby the central lobular lesions and those of renal anoxia (Maegraith et al. 1945) are simultaneously produced. In conditions in which the liver is primarily affected the process may be initiated solely by intrahepatic stimuli, possibly arising from the damage to the cells, or directly from toxic substances—e.g., chloroform—acting on them though there is evidence that so-called "liver poisons" are part of a generalised pathological process (Williamson and Mann 1923).

SUMMARY

The hepatic lesions in severe malaria and blackwater fever are distributed mainly in the central zone of the lobules.

The lesions are non-specific and are essentially similar to those of a great variety of other conditions.

The cellular changes develop primarily from anoxia.

We maintain that the lesions arise from stagnant anoxia resulting from active obstruction to the venous outflow from the liver, and that this arises from constriction of some part of the hepatic venous tree.

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This constriction is brought about mainly by nervous reflexes which may have their origin within or outside the liver. In the latter case they probably explain the frequently reported relation between hepatic and renal disturbances.

Postscript.—Later evidence suggests that the vascular reflex described above is not the only intrahepatic mechanism causing centrilobular anoxia. Professor Himsworth has shown that swelling of the parenchymal cells may partially obstruct the flow of blood through the liver, giving rise to centrilobular degeneration. Working independently we have come to the conclusion that this happens with CCl_4 poisoning, though in some cases the reflex postulated above may contribute. We still believe that a vascular reflex is of great importance in producing centrilobular degeneration.

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EPIDEMIC MYALGIA OR BORNHOLM DISEASE IN SOUTH INDIA

A REVIEW OF 19 CASES

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OUTBREAKS of epidemic myalgia or Bornholm disease arouse interest mainly because of the difficulties of the differential diagnosis. So far as we know, no outbreaks have been reported from tropical or subtropical countries except Alabama (Nichamin 1945) and a Caribbean island (McDaniel 1944).

Benign epidemic pleurisy (Williamson 1924) closely resembles it and has been observed by Scadding (1946) in the Middle East, and Roche and Smiddy (1946) in India. The latter paper, however, seems to deal more with an upper respiratory infection.

In twelve weeks, from the end of June to the end of September, there were 19 cases of a benign myalgic syndrome in a South India garrison, 14 of these cases occurring in one unit; 2 of the patients were Indian and 17 were Europeans. The clinical picture was in each case ill defined, but that of the series as a whole tallied very well with Sylvest's (1932) description of Bornholm disease. In all our cases the myalgia predominated, distinguishing them from the series observed by Scadding (1946) and Roche and Smiddy (1946). In fact, 5 out of 20 attacks observed were suspected of being acute abdominal emergencies, the myalgia giving the impression of rigidity; and 2 of the patients underwent exploratory laparotomy.

We wish to draw attention to the possibility of the occurrence of Bornholm disease in India, and the need to distinguish this malady from other acute upper abdominal or thoracic pains. Our findings are summarised in the accompanying table.

CLINICAL PICTURE

Onset was sudden, with severe pain in the lower part of the chest and/or upper abdomen.

Pain was aggravated by any movement of the affected muscles, such as deep breathing, coughing, pressing, or rotating the trunk. The patients repeatedly volunteered the information that laughing particularly exacerbated the pain; in one case the attack started during a fit of laughter. The centre of the pain was either in the upper epigastrium, radiating to the side, or in one hypochondrium. It lasted, on the average, 48 hours; if longer, it was interrupted by remissions of various lengths.

Temperature ranged between 100° and 102°F in about half the cases; in the other half it was normal. In the pyrexial cases, the temperature usually returned to normal with the disappearance of the pain. The pulse-rate was not raised in proportion to the temperature.

In practically all cases the affected muscles were tender. There were no other physical signs; no pleural friction was heard. There were no characteristic changes in the blood picture, except a suggestion of a mild relative lymphocytosis. In 15 cases examined radiologically, no abnormalities of the chest were detected.

ILLUSTRATIVE CASE-RECORDS

Case 5.—Acute onset of continuous stabbing pain in right lower chest and upper abdomen six hours before admission. Pain was aggravated by deep breathing.

On examination: temperature 98°F, pulse-rate 88, respirations 18. Chest movements diminished; percussion note

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resonant; breath sounds normal, but poor air entry at both bases. Board-like rigidity of abdominal muscles. Maximal point of tenderness appeared to be a little below the xiphisternum. Patient looked toxic, with congested face. Radiography of the chest negative.

Exploratory laparotomy for a suspected perforated peptic ulcer showed no abnormality. Temperature settled within 48 hours, but it was difficult to assess the duration of the pain owing to the abdominal incision. White-cell count 7000 per c.mm. (polymorphs 86%). Convalescence uneventful.

Case 14.—Admitted with 24 hours' history of pain, of sudden onset, in left side of chest. This started while he was on a march, and was so severe that he had to fall out. He then went to bed, with a temperature of 100°F. In the morning he had a violent frontal headache and felt he could not take a deep breath.

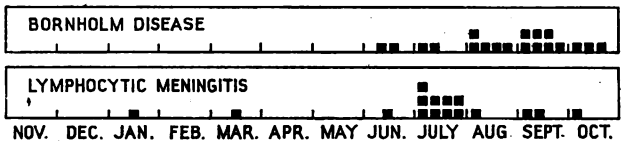
On examination: temperature 98°F, pulse-rate 70, respirations 20. Definite tenderness of muscles in 3rd–5th left intercostal spaces in anterior axillary line. Pectoral muscles tender on firm pressure. White-cell count 6800 per c.mm. (polymorphs 53%, lymphocytes 38%). Chest radiogram negative. Urinary chlorides normal.

Pain became gradually less severe, and patient was completely free of it five days after admission. He had been afebrile since admission.

COMMENTS

The outstanding clinical features of epidemic myalgia vary from outbreak to outbreak. As in Sylvest's (1932) description, upper epigastric and low chest pain, muscular tenderness, mild pyrexia of short duration, and embarrassment of breathing were prominent.

The importance of the differential diagnosis is shown by the fact that 5 cases simulated abdominal emergencies



Coincidence of outbreaks of Bornholm disease and of lymphocytic meningitis in South India.

so closely that 2 of them were operated on by different surgeons. It was the opinion of all the medical officers who examined these cases that they were indistinguishable from an early acute abdomen, and it is only in the context of the whole series of the cases that similar errors were avoided. It is perhaps helpful to note that the collapse of classical intestinal perforation was not present. Rather did our patients have a toxic look, with a congested face and drowsy appearance.

The tendency of the pain to shift from the centre to the side, and its relation to respiration, suggests pleurisy, appendicitis, cholecystitis, and amœbic or other hepatitis. We are, however, satisfied from clinical observation

Case no.	Pain		Pyrexia	Leucocyte-count			Tenderness of muscles	Remarks
	Site	Duration		Day	Total (per c.mm.)	Lymphocytes (%)		
1	Lower abdomen	5 hr.	Nil	..	..	..	+	Rigid abdomen; laparotomy performed; nil abnormal found
2	Right hypochondrium	72 hr.	Nil	3rd	5200	..	+	..
3	Right hypochondrium	24 hr.	100°F for 24 hr.	..	..	..	+	Rigidity +; suspected acute abdomen, but operation not performed
4	Right hypochondrium	48 hr.	101°F for 48 hr.	..	..	..	+	..
5	Right hypochondrium and epigastrium	48 hr.	Nil	2nd	7000	..	++	Rigidity +; laparotomy performed; nil abnormal discovered
6	Right hypochondrium and epigastrium	48 hr.	102°F for 48 hr.	1st	8000	36	..	Toxic, with congested face; suspected acute abdomen; first case suggesting myalgia
7	Right hypochondrium	72 hr.	Nil	8th	7400	35	++	..
8	Right hypochondrium	48 hr.	102°F for 48 hr.	1st	15,000	40	..	Toxic, with congested face
9	Right hypochondrium and epigastrium	48 hr.	101°F for 24 hr.	1st	15,000	36	+	..
10	Epigastrium	6 days	Nil	2nd	6600	..	+	Pain started after a route march; urinary chlorides normal; treated in outpatient department
11	Epigastrium	6 days	Nil	3rd	6800	..	+	Pain started after a route march; urinary chlorides normal; treated in outpatient department
12	Epigastrium and circumumbilical	10 hr.	Nil	..	..	..	+	Suspected acute abdomen
13	Right hypochondrium and circumumbilical	60 hr.	102°F for 48 hr.	1st	8200	..	+	Pain so severe as to require morphine on night of admission
14	Left chest	5 days	100°F for 24 hr.	2nd	6800	38	+	Urinary chlorides normal; Hb normal
15	Right and left chest, and upper abdomen	60 hr.	100°F for 24 hr.	3rd	7200	40	+	Urinary chlorides normal; Hb normal
16	Left chest and epigastrium	5 days	Nil	..	7200	36	+	Mild diarrhœa; urinary chlorides normal; Hb normal
17	Right chest and epigastrium	72 hr.	Nil	..	..	..	+	Urinary chlorides normal
18	Right hypochondrium	36 hr.	Nil	1st	5000	..	+	Relapsed after 5 days, becoming case 19
19	Left chest	48 hr.	101°F for 48 hr.	2nd	7000	..	+	Relapse of case 18
20	Right and left hypochondrium, and epigastrium	72 hr.	Nil	2nd	6800	..	+	..

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and the invariably benign course that none of these conditions was present in any of our patients.

White-cell counts varied widely, as reported by other observers. No reduction in the hæmoglobin level was noted in the cases examined. The age and sex incidence, all cases being men below the age of 30, is not significant, as we were dealing with a military population of young men.

The description by Goldstone and Le Marquand (1946) of 13 cases in British soldiers in West Africa of a syndrome simulating acute abdominal disease seems to us to be a perfect description of an outbreak of Bornholm disease, except for one atypical case in which the pain was in the upper abdomen and back. Their contention that these cases (which like ours recovered spontaneously and rapidly) were abortive forms of perinephric staphylococcal infection does not appear to be supported by any objective findings. The benign clinical course of their cases (with the one exception) is to all intents and purposes identical with that in our series.

Huss (1934), Lindberg (1936), and Howard et al. (1943) have recorded an associated lymphocytic meningitis or meningo-encephalitis. None of our cases showed any neurological signs, but there have recently been several cases of benign lymphocytic meningitis in this area. The monthly incidence of lymphocytic meningitis and Bornholm disease is shown in the accompanying figure.

The climate in this station is subtropical. Naturally, the question arose if these muscular spasms could not be the result of sodium-chloride depletion. We therefore estimated the urinary chlorides in some cases but found no deficit, even in two patients in whom the attack had started immediately after long route marches.

In an epidemic in Mobile, Alabama, the prevailing climate being that of excessive rainfall with periods of continuously high humidity, warm moist weather was thought to be a precipitating factor (Nichamin 1945). The present cases all occurred during an unusually late and heavy monsoon with long periods of moist heat. One must, however, not forget that most epidemics have been observed in countries such as Denmark, Norway, and Iceland. Warm moist weather there and in South India are very different. We have convinced ourselves that the men in the most affected unit were not living under conditions of overcrowding, there being one room for every two soldiers.

In the Mobile epidemic the patients were left for an appreciable period with marked debility. This was not so in the present epidemic, as all the patients returned to full military duty immediately after discharge from hospital.

SUMMARY

A series of 19 cases of Bornholm disease or epidemic myalgia occurring in South India is reviewed.

In 2 cases the rigidity of abdominal muscles led to exploratory laparotomy.

We wish to thank Lieut.-Colonel C. Greenway, R.A.M.C., officer commanding this hospital, for his interest and permission to publish these cases, and Capt. E. A. Spriggs, R.A.M.C., graded physician, for his help in collecting the clinical data.

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SYMPTOMS DUE TO MECKEL'S DIVERTICULUM

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THE discovery of a Meckel's diverticulum during a laparotomy must come as a surprise to most surgeons, for it is an uncommon congenital abnormality. Harkins (1933), who collected all those recorded where complete examination of the gastro-intestinal tract was made post mortem, found that in 25,149 necropsies it was present on 327 occasions—an incidence of 1·3%. Often the diverticulum is merely an incidental finding when the abdomen is opened for some quite different reason; rarely it is itself the site of disease, and on this account it is seldom if ever incriminated before operation. Among 69,000 admissions to the Truesdale Hospital Atwood (1946) has reported 37 cases with symptoms due to a Meckel's diverticulum. In the records of King's College Hospital there are numerous references to the finding of Meckel's diverticulum during abdominal operations, but only 11 times in eighteen years (1928–45) * was it the actual cause of symptoms which necessitated surgical intervention. Thirteen cases are briefly reviewed below, with the addition of one of different causation, as a result of which it is tentatively suggested that Meckel's diverticulum may be involved in the pathogenesis of chronic as well as acute abdominal pain.

Developmentally the vitelline duct communicates at an early stage between the yolk-sac and the midgut of the embryo. Normally it is obliterated from the umbilicus inwards, and therefore the intestinal end more often remains patent. It is this tube-like structure which is called Meckel's diverticulum and it may show any stage of involution, from complete patency between umbilicus and gut to a small sac ending in a fibrous cord attached to the anterior abdominal wall, or merely a free blind sac. Wilson (1942) classified the types as follows:

(1) Connexion between umbilicus and gut persists as a fibrous band or as an intestinal fistula.
(2) Umbilical portion of duct persists.
(3) Intestinal portion of duct persists.

Type 3 is the commonest finding and was the one first described by Meckel (1809, 1812).

ACUTE SYMPTOMS

In the accompanying table are collected the 11 cases of acute surgical conditions due to a Meckel's diverticulum.

The complications arising in connexion with Meckel's diverticulum are briefly as follows:

(1) Intestinal obstruction due to a band or to volvulus.
(2) Inflammation; perforation.
(3) Intussusception.
(4) Ulceration of heterotopic gastric mucosa; hæmorrhage indicated by melæna; perforation.
(5) Foreign body.
(6) Neoplasm.
(7) Aberrant pancreatic tissue.
(8) Strangulation in hernial sac (Littré's hernia).

1. *Intestinal obstruction* is the commonest complication and is either due to direct pressure on a loop of gut or to an actual volvulus (Rothman and Zetena 1943) caused by the rotation of gut round a diverticulum attached at its tip to the abdominal wall. Cases 2, 4, 7, and 11 in the table fall into this category, and the prognosis depends on how early the intestinal obstruction is treated.

* During the war years, however, there was not the usual admission of patients.

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2. *Inflammation or diverticulitis* (sometimes progressing to perforation) simulates appendicitis so closely that the correct diagnosis is unlikely to be made. Rousseau and Martin (1943) reported the case of a girl, aged 15 years, who complained of pain in the right lower quadrant of the abdomen. There were four attacks of pain in six months, each lasting six hours and being preceded by nausea and followed by vomiting. The surgeon was not satisfied with the diagnosis of appendicitis and, after the acute symptoms had subsided, a barium examination was done, with the result that a four-hour film showed a pear-shaped sac in the terminal ileum; the appendix did not fill. This shows that in favourable circumstances a Meckel's diverticulum may be demonstrated radiologically, which may be important in the diagnosis of abdominal pain (see below).

3. *Intussusception* is a particularly lethal complication of Meckel's diverticulum. It occurred twice in this series but is not common. Of Atwood's (1946) series of 37 cases of Meckel's diverticulum only 1 developed an intussusception through inversion of the diverticulum. Harkins (1933), reviewing the cases published earlier, found only 160, and added 2 more. He pointed out that intussusception due to an invaginated Meckel's diverticulum differed from the ordinary intussusception in four ways: it occurred in older children; there was usually a history of a previous attack; the progress was more chronic and more mild; and vomiting was usually more intense.

4. *Ulceration of heterotopic gastric mucosa* (hæmorrhage indicated by melæna) is an interesting finding in the diverticulum. There was 1 case of this in the present series, and the leiomyoma in case 10 may well have arisen in ectopic gastric tissue, but this could not be demonstrated after the widespread secondary changes had taken place. Marshall (1942), reviewing 12 consecutive cases of diseased diverticula, propounded the view that this was the commonest complication in the younger patient, whereas the older age-group tended to develop intestinal obstruction or inflammatory lesions. Aschner and Karelitz (1930) discussed the condition, mentioning 21 previously recorded cases of Meckel's diverticulum containing gastric mucosa, in 12 of which ulceration had taken place. They added 2 cases of their own in which bleeding from the bowel was the presenting sign. Mr. Rupert Corbett has kindly sent me particulars of 2 further cases of bleeding from Meckel's diverticulum. Since a correct preoperative diagnosis was made, a brief case-record of each is given here.

Case 12.—A boy, aged 2 years, was admitted to St. Bartholomew's Hospital on Feb. 16, 1942, having passed blood in his motions. The mother had noticed bright blood in a loose motion three weeks previously. The child appeared well otherwise, with no vomiting or pain. Thereafter he passed a dark stool daily, started to go off his food, and complained of lassitude. Three days before admission he started to improve and passed more normal motions.

Examination.—The child was well built but pale and irritable. Abdomen, nothing abnormal discovered; sigmoidoscopy normal. Temperature went up to 100°F and pulse-rate varied from 100 to 120. Hæmoglobin 34%, falling later to 29%; next month it rose to 58%. No pathogenic organisms isolated from stools. Heterotopic gastric mucosa in a Meckel's diverticulum was suspected, but the mother did not agree to operation.

The patient returned on May 23, 1942, with recurrent hæmorrhage; his health had deteriorated; Hb 47%, pulse-rate 120, temperature normal.

Operation.—On May 27 a laparotomy was performed, and a large Meckel's diverticulum situated 9 in. from the ileo-cæcal valve was removed. The specimen was sectioned by Dr. Cuthbert Dukes, who found large numbers of gastric glands with both pepsin-secreting and acid-secreting cells. There was a small nodule of tissue resembling pancreas. The specimen was presented to the Royal College of Surgeons.

Case 13.—A male, aged 19, was admitted to hospital on Aug. 20, 1941, passing black motions. In 1930 he had fallen off a wall, and two days later had passed black motions for a fortnight. Diagnosed as traumatic intestinal hæmorrhage at St. Bartholomew's Hospital. Six months later he had had a shorter attack after eating crackling on roast pork. In 1938 he had again been investigated for abdominal pain and dark motions. Since then he had suffered three or four attacks of melæna a year.

Examination.—Pale, nothing abnormal found. Sigmoidoscopy, barium examination, and gastroscopy all normal.

Operation on Sept. 20, 1941, revealed a small Meckel's diverticulum 2 ft. from the ileocæcal valve and adherent to the mesentery with several enlarged lymphatic glands nearby. Section of the diverticulum by Dr. Dukes showed heterotopic gastric mucosa with ulceration.

Follow-up.—Seen on Aug. 25, 1942, patient was very fit and serving in Royal Air Force.

ACUTE SURGICAL CONDITIONS DUE TO MECKEL'S DIVERTICULUM

Case no.	Sex	Age (yrs.)	Clinical findings on admission	Provisional diagnosis	Operative findings	Result
1	M	31	Acute abdominal pain; nausea, vomiting; tenderness not localised	Appendicitis	Gangrenous M.D.	Recovery
2	M	11	Abdominal pain; tympanites; absolute constipation 3 days	Intestinal obstruction	M.D. twisted round and obstructing gut	Death
3	M	4	Abdominal pain 48 hr.; vomiting; mass in right side; blood and mucus present per rectum	Intussusception	Intussusception with M.D. at tip	Death
4	M	64	Abdominal pain; vomiting for days	Intestinal obstruction	Small intestine obstructed by M.D. attached to anterior abdominal wall	Recovery
5	M	10	Abdominal pain few hours; vomiting; shock; mucus only per rectum	Intussusception	Intussusception with M.D. at tip	Recovery
6	F	36	Abdominal pain 24 hr.; no vomiting; 2 months pregnant; tender right iliac fossa	Appendicitis	Inflamed M.D.	Recovery
7	M	23	Abdominal pain 3 days; vomited continuously; hiccups; ileus	Intestinal obstruction	Small intestine obstructed by M.D.	Death
8	M	6	Abdominal pain 2 days; no vomiting; tender in right side of epigastrium	Appendicitis	M.D. with peptic ulcer at tip; subacutely inflamed appendix	Recovery
9	M	44	Abdominal pain; no vomiting; tender in both iliac fossæ	Appendicitis	Inflamed M.D. containing gastric mucosa; subacutely inflamed appendix containing 2 carcinoid tumours	Recovery
10	M	30	Recurrent attacks of severe melæna; two blood-transfusions; barium enema showed no abnormality	Duodenal ulcer	Leiomyoma of M.D. adherent to another loop of ileum	Recovery
11	M	73	Acute pain around femoral canal; constipation	Strangulated hernia	Littré's hernia with gangrenous diverticulum	Recovery

M.D. = Meckel's diverticulum.

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Sir Gordon Gordon-Taylor also informs me that he has had 1 case of bleeding from an ulcerated Meckel's diverticulum. Schullinger and Stout (1934), reviewing this complication in the light of 68 previously recorded cases, wrote: "Sudden severe pain in the lower abdomen with rigidity, signs of diffusing peritonitis, fever and leucocytosis, especially in children should lead to suspicion of Meckel's diverticulum. Cryptic intestinal bleeding should make one suspect Meckel's diverticulum as a possible source."

5. A *foreign body* is occasionally met with in an inflamed Meckel's diverticulum, and has probably the same significance as a foreign body in the inflamed appendix. Case 6 presented an acutely inflamed diverticulum which on being cut open was found to contain a rolled portion of tomato skin.

6. *Neoplasm* is a rare complication, but 1 is recorded in this series. The leiomyoma reported here had caused repeated melæna, which on more than one occasion had necessitated blood-transfusion, a bleeding duodenal ulcer being suspected. The patient was admitted with Hb 32% and required four pints of blood before laparotomy could be undertaken. The tumour was well encapsulated and very vascular, but with no evidence of malignancy. This patient replied to an inquiry on Oct. 21, 1946, that he was fit and well, weighed 12 st., and had suffered no further attacks of bleeding.

7. *Aberrant pancreatic tissue* occurs in many sites in the abdomen, but Hunt and Bonesteel (1934) could find only 13 recorded cases in which it had been demonstrated in Meckel's diverticulum. They added a 14th case in which the presenting symptom was acute lower abdominal pain unassociated with vomiting, tenderness, or rigidity. It is interesting to speculate whether the pancreatitis seen in these cases is primary or secondary to an inflammation of the diverticulum; possibly such tissue could be involved in mumps.

CHRONIC SYMPTOMS

All the above complications manifest themselves in some form of acute abdomen, and I have found no record of a Meckel's diverticulum causing chronic or subacute abdominal symptoms. This is all the more surprising when it is remembered that any diverticulum of a hollow viscus is a potential source of pain if it is distended. Spriggs and Marxer (1925–26), in their comprehensive review of intestinal diverticula, state that duodenal and jejunal diverticula may give rise to definite and sometimes distressing symptoms. "The cause of the symptoms is probably mainly stretching of the walls of the pouch by distension with food or irritation by either acid or putrefying material." It is remarkable therefore that the most constantly present diverticulum of the small intestine (Edwards 1939) should not have been described as producing symptoms similar to a diverticulum of the duodenum or jejunum. The following case illustrates the type of clinical picture which may be presented:

Case 14.—A leading seaman, aged 27, reported to a Naval sick-bay complaining of pain in the lower abdomen which had troubled him intermittently for six months. He pointed to a spot three finger-breadths above the symphysis pubis as the site of the pain and said that it was occasionally severe enough to wake him at night.

Examination.—He was a well-built man with tongue clean and moist and abdomen moving normally on respiration. On palpation a vague swelling could be made out just to the right of and below the umbilicus, and on firm pressure the pain could be reproduced. There was no hernia; patient had never vomited during an attack and did not have constipation or difficulty of micturition. Urine: sp. gr. 1·016; acid reaction; no albumin, sugar, or ketones present. Blood-count: red cells 4,810,000; Hb 104%; colour-index 1·08; white cells 6400 per c.mm. (polymorphs 66%, lymphocytes 29%, monocytes 3%, eosinophils 2%). Wassermann and Meinicke reactions negative.

Straight radiography of the abdomen revealed no abnormality. At barium-meal examination the stomach and duodenum were seen to have normal outlines; no evidence of diverticulum was detected; the meal passed normally through the intestine.

Operation.—As the patient continued to have intermittent attacks of pain and discomfort, it was decided to perform a laparotomy, the provisional diagnosis being a mesenteric cyst. The abdomen was opened; there was no excess of free fluid, the appendix appeared healthy, and there were no adhesions. The stomach and duodenum appeared normal, and no diverticulum of the latter was present; pancreas normal on palpation; no evidence of a mesenteric cyst. A tubular Meckel's diverticulum, with engorged vessels coursing over its apex, was discovered about a foot from the ileocæcal junction; and, as this would lie naturally in approximately the position at which the patient complained of his pain, it was decided to remove it. A crushing clamp was placed across its base, and it was excised; the ileum was narrow at this point and, as the removal of the diverticulum decreased its breadth even further, a side-to-side anastomosis was performed to ensure that stenosis was not produced. The appendix was removed and the abdomen closed.

Progress.—Convalescence was uneventful. Eighteen days after operation he was discharged from hospital with a soundly healed wound and complete relief from his previous pain and discomfort.

A month later he was having some trouble with flatulence, but four months later he was completely free from his old complaints.

Pathologist's Report (Dr. W. W. Woods).—"Meckel's diverticulum; no gastric mucosa; no pathological change. A bell-shaped piece of intestine and thus a characteristic Meckel's diverticulum. It has been turned inside out and fixed in this position. It measures about 1·5 cm. in diameter. The mucosa looks normal, being grey, velvety, and thrown up into ridges. No sign of a different sort of mucosa in any part. No congestion. No ulceration. Serosa is partly grey, partly dull red. Wall not thickened; mucosa, submucosa, and muscularis are each about 0·05 cm. thick.

"The diverticulum has the structure of normal intestine. Its villous mucosa is everywhere the same. There is no gastric mucosa. The occasional epithelial cells with eosinophilous cytoplasm in the deeper glands are the normal cells. Apart from the normal areas of lymphoid tissue, the connective tissue of the mucosa contains eosinophil leucocytes, lymphocytes, and plasmacytoid cells, but they do not appear to be in greater numbers than are found in normal intestinal mucosa. The moderate degree of congestion of submucosa and subserosa and the few focal hæmorrhages occurred during the operation. Thus there is no inflammation, nor strangulation, nor any other pathological change."

A thorough investigation of this patient was made before and during operation, and it could reasonably be claimed that most of the other causes for these attacks of abdominal pain had been eliminated. After excision of the diverticulum the patient was completely relieved of his symptoms; hence it appears very probable that his attacks of pain were due to intermittent distension of his diverticulum, its inability to empty, or narrowing of the small intestine at this point. The narrowing or "coarctation" of the ileum opposite the diverticulum may have been responsible for its inability to empty properly. It might have been wise to resect the segment of intestine rather than amputate the diverticulum and then short-circuit the coarctation as was done in this case.

This is only a single case-record, but it suggests that if the possibility of such a condition were kept in mind others might be found. It provides yet another good reason for looking for a Meckel's diverticulum when every appendicectomy is performed, and it is precisely in those patients with a not too clear-cut clinical picture of appendicitis that the condition is most likely to be encountered. Though the diverticulum was not shown at barium examination in this case, it is sometimes possible to show its presence, as in Rousseau and Martin's (1943) patient. I do not agree with Greenblatt et al. (1936) that all Meckel's diverticula encountered at laparotomy should be removed as a routine.

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An analysis of the last 11 cases of acute abdomen in which a Meckel's diverticulum was the causal factor admitted to the hospital shows examples of practically every known complication, and confirms the opinion of previous writers on the subject that the correct diagnosis is rarely made before operation.

The commonest situation for this developmental error is 18 in. from the ileocæcal valve, but it has often been discovered 12–36 in. from the end of the ileum; therefore, unless the whole terminal 3 ft. of ileum is inspected, it may be overlooked.

SUMMARY

Meckel's diverticulum occurs in 1·3% of people and is found in the ileum 18–36 in. from the ileocæcal valve.

Acute abdominal symptoms are caused by the diverticulum, and the pathogenesis of these has been investigated in 11 consecutive cases. Two additional cases presenting melæna are described.

Subacute or chronic abdominal symptoms were caused by the diverticulum in 1 case and its mechanism is discussed.

Meckel's diverticulum should be looked for more often and more carefully, especially in laparotomies where the other abdominal organs do not appear sufficiently abnormal to explain the signs and symptoms.

It is a pleasure to acknowledge the assistance given by Sir Gordon Gordon-Taylor and Mr. Rupert Corbett in providing information about their cases, to Dr. W. W. Woods for the pathological report, and not least to Miss D. A. Fern, chief clerk of the record department, King's College Hospital.

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DETERMINATION OF HÆMOGLOBIN

II. THE HALDANE HÆMOGLOBIN STANDARD

COMPARED WITH IRON AND GASOMETRIC ESTIMATIONS

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THE Haldane-Gowers method for estimating hæmoglobin has been widely used in this country for many years in determining normal English hæmatological values and assessing nutrition. It is therefore desirable that the results obtained by this method should be capable of comparison with the results of other methods in other countries, but before this can be achieved it is necessary to be certain what the Haldane standard represents in terms of hæmoglobin.

The solution of carboxyhæmoglobin which Haldane (1901) adopted as a standard was equal in colour to a 1% dilution of blood which had an oxygen capacity of 18·5 ml. of oxygen/100 ml. as estimated by the Haldane gasometric method. The application of Hüffner's (1894) factor (1 g. of Hb = 1·34 ml. of O_2) converts 18·5 ml. of oxygen to 13·8 g. of hæmoglobin (Hb). Hence it has been generally accepted that 100% on the Haldane scale is equivalent to 13·8 g. of Hb/100 ml.

More recently the method of standardisation has been altered, colour tubes being defined in terms of colour, and only indirectly in terms of oxygen capacity.

B.S.I. COLOUR STANDARDISATION

The standardisation of the Haldane Hb method—British Standard 1079 (1942) (Donaldson et al. 1943)—was undertaken to remove as far as possible the non-personal error in the Haldane hæmoglobinometer. In the British Standards Institution (B.S.I.) specification, limits of accuracy were set for each part of the apparatus—colour tube, dilution tube, and pipette. The limits were chosen to be acceptable to both user and manufacturer: sufficiently narrow not to add appreciably to the experimental error, and wide enough to allow economic production by the manufacturer. For the colour tube a colour definition was adopted. The optical absorption of the completed tube was specified rather than the chemical properties of the Hb solution. This course was taken because the primary function of the colour tube is to act as a colour standard, and because colour can be measured as accurately as oxygen or iron. There also follows the advantage that a colour tube can be tested at the last stage of manufacture and at any time in the course of its life.

The maintenance of the colour standard at the National Physical Laboratory (N.P.L.) has now been going on for about five years. On the whole, the methods of colour specification adopted in British Standard 1079 have been found satisfactory in practice. It has been possible to make calibrated colour tubes generally available at reasonable cost. With the present steady improvement in colour-measuring apparatus, both visual and photo-electric, an accuracy corresponding to $\pm 1/2\%$ in Hb concentration can be realised both in the maintenance of the standard and in the routine testing of the tubes for distribution. The unexpected permanence of the colour tubes also helped considerably to reduce the work connected with maintenance. These tubes have the reputation of sometimes fading badly, and certainly we have come across some examples of discoloured tubes of older manufacture; but, since the standardisation, none from the current commercial production has been found to fade in this way. In the course of the colour-tube testing at the N.P.L. some 20 tubes have been measured and subsequently remeasured after being in use for an average interval of about 2 years. The average rate of change is 0·2% per year. This performance compares very favourably with that of other colour standards, such as dyed gelatin filters or even some coloured glasses.

OXYGEN AND IRON EQUIVALENT

In the preparation of the colour standard, the oxygen content of a sample of blood was determined by the Haldane blood-gas apparatus, and its colour after conversion into carboxyhæmoglobin was estimated by a photo-electric spectrophotometer. The colour corresponding to an oxygen capacity of 18·5 ml./100 ml. of blood was then standardised. This method of defining the standard followed the usual practice for making colour tubes; and comparisons with some older tubes, notably one belonging to Dr. C. Price-Jones with which he carried out work on hæmatological standards, afforded confirmatory evidence that the new standard was in agreement with Haldane's original definition.

For some time, however, evidence has been accumulating which suggests that this standard colour represents more than 13·8 g. of Hb. Surveys of the values of normal English males in which an equivalent standard was used—e.g., Price-Jones et al. 1935—gave significantly lower results than those in which other methods for estimating

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TABLE I—SCHEME OF INVESTIGATIONS CARRIED OUT DURING TWO SESSIONS AT DIFFERENT CENTRES

Session	Year	No. of samples	Donors	Investigations at: P.M.S.L.	Cardiff	Oxford	N.P.L.
1	1945	11	Normal adult males	Fe analysis O_2 capacity	O_2 capacity	Fe analysis O_2 capacity CO capacity	Spectrophotometer, colour comparator
2	1946	10	Normal adult females	Fe analysis O_2 capacity CO capacity	O_2 capacity	..	Spectrophotometer, colour comparator

Hb were used—e.g., Jenkins and Don (1933)—and normal figures from the U.S.A. and other parts of the world agreed more closely with the latter observations (Wintrobe 1942).

It was also observed independently by two of us (E. J. K. and R. G. M.) that estimations by the Haldane method and by photo-electric methods standardised by iron determination suggested that commercial Haldane standards, at any rate, represented more Hb than supposed.

These results suggested that there was need for a more authoritative determination of the Hb equivalent of the standard. The 1942 standardisation experiment was designed on too narrow a basis (one blood only) to give a generally valid relation between oxygen and colour. Its primary purpose was not to establish this relation but to transfer the fundamental definition from oxygen to colour. All that was required, therefore, was that it should be more accurate than the commercial methods for producing colour tubes, which it undoubtedly was. When the colour definition and a technique for the production of accurately calibrated tubes had been established, the task of linking colour with oxygen and iron could be undertaken more advantageously.

Macfarlane and O'Brien (1944) and King et al. (1944) carried out an extensive determination of this relationship with 49 and 20 bloods respectively. The result was that the B.S.I. standard was found to be equivalent to 14·7 g. of Hb on an oxygen basis, and 14·8 g. of Hb on an iron basis. This difference from 13·8 g. was considered too large to be explained on the grounds of experimental error, though no adequate explanation for the discrepancy was offered.

In these latter experiments the colour was determined by the usual hæmoglobinometer colour tube and dilution tube. Macfarlane (1945) has shown that with some observers the personal error in colour matching far exceeds the calibration errors, and that the colour measurement was probably for this reason more unreliable than the oxygen or iron estimations. Following a suggestion put forward by him, the work has been repeated with the substitution of the N.P.L. colour-measuring equipment for the Haldane Hb method.

TABLE II—COMPARISON OF HÆMOGLOBIN CONTENTS OF 21 NORMAL BLOODS DERIVED FROM IRON AND GASOMETRIC DETERMINATIONS WITH THE HALDANE VALUES AS MEASURED IN COLOUR COMPARATOR

Blood	Hb value of blood on Haldane scale	Hæmoglobin (g.) corresponding to 100% Haldane: By iron analysis P.M.S.L.	By iron analysis Oxford	By gas analysis: Oxygen P.M.S.L.	Oxygen Cardiff	Oxygen Oxford	Carbon monoxide Oxford: Without prelim. reduction	Carbon monoxide Oxford: After reduction
Male:								
1	103·1	14·85	14·78	14·39	..	..	14·66	14·84
2	108·4	15·12	15·11	14·63	..	14·76	15·02	15·16
3	105·6	14·83	15·05	14·50	..	14·51	14·67	15·13
4	104·8	14·91	14·80	14·30	14·31	14·29	14·61	15·03
5	102·3	15·01	14·85	14·59	14·74	14·55	14·69	15·14
6	108·9	14·83	14·89	14·21	14·45	14·30	14·49	14·95
7	115·6	14·92	14·87	14·42	14·45	14·55	14·68	14·88
8	111·7	14·97	14·83	14·53	14·69	14·75	14·70	14·90
9	105·2	14·72	14·52	14·43	14·33	14·20	14·39	14·53
10	99·8	15·01	14·62	14·57	14·43	14·58	14·58	14·84
11	113·9	15·03	14·62	14·52	14·48	14·34	14·74	15·00
Mean	..	14·93	14·81	14·46	14·49	14·48	14·66	14·95
σ	..	0·12	0·17	0·12	0·15	0·18	0·15	0·17
Female:							P.M.S.L.	
1	109·6	14·64	..	14·07	14·14	..	13·86	14·46
2	93·7	14·92	..	14·35	14·78	..	14·07	14·75
3	88·9	14·54	..	14·03	14·30	..	14·33	14·67
4	92·4	14·60	..	13·95	14·06	..	14·00	14·02
5	83·9	14·82	..	14·50	14·65	..	14·62	14·61
6	88·2	14·67	..	14·48	14·56	..	14·34	14·43
7	83·6	14·70	..	14·40	14·62	..	14·49	14·65
8	79·8	14·80	..	14·45	14·75	..	14·54	14·66
9	93·1	14·82	..	14·33	14·64	..	14·35	14·49
10	91·3	14·93	..	14·46	14·53	..	14·38	14·44
Mean	..	14·74	..	14·30	14·50	..	14·30	14·52
σ	..	0·13	..	0·21	0·25	..	0·25	0·21

TABLE III—HÆMOGLOBIN EQUIVALENT OF B.S.I. STANDARD

—	Hæmoglobin (g.) corresponding to 100% Haldane: By iron analysis (P.M.S.L.) Spectrophotometer	By iron analysis (P.M.S.L.) Comparator (from table II)	By oxygen analysis (P.M.S.L. and Cardiff) Spectrophotometer	By oxygen analysis (P.M.S.L. and Cardiff) Comparator (from table II)
Male ..	14·77	14·93	14·33	14·47
Female	14·74	14·74	14·40	14·40
Mean ..	14·75	14·84	14·37	14·44
	Final mean 14·80		Final mean 14·41	

The arrangements of this redetermination and its results are described below.

EXPERIMENTAL

General Organisation.—The work was carried out during a large-scale investigation into the accuracy of different methods of Hb determination, conducted simultaneously at the Postgraduate Medical School of London, the University of Cardiff, the Radcliffe Infirmary, Oxford, and the National Physical Laboratory. Venous blood was withdrawn from subjects at Oxford, and samples were distributed by post to the other centres, considerable care being taken to make sure that the samples were truly representative of the original blood. Simultaneous determinations at the various centres were then carried out; these usually began within 24 hours of taking the blood. Generally one or two samples of blood were dealt with during each week of an experimental session. Further details are given in table I.

Briefly, iron was determined by titration with titanous chloride (Delory 1943); oxygen capacity was determined according to the method of Van Slyke and Neill (1924); and carbon monoxide capacity, both before and after preliminary reduction, was measured.

Preparation of Solutions.—Solutions of as many as six different Hb derivatives were prepared. For the present purpose, however, solutions of carboxyhæmoglobin were prepared as follows:

With calibrated pipettes and volumetric flasks, dilutions of the blood sample (1·0% and 0·5%) were made with 0·04% ammonia.

The solutions were then placed in conical flasks and thoroughly gassed with the commercial coal-gas supply, since preliminary experiments had shown that commercial coal-gas (tested in parallel with pure carbon monoxide) did not introduce an appreciable error.

After being gassed, the solutions were preserved in stoppered bottles; if a delay of more than an hour elapsed between the preparation and colour measurements, the solutions were regassed immediately before the measurements were made.

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RESULTS

For each blood sample the following determinations were obtained:

(1) The iron content in mg. of Fe/100 ml. of blood.

(2) The oxygen capacity in ml. of O_2/100 ml. of blood, and the carbon-monoxide combining power, both before and after reduction, in ml. of CO/100 ml. of blood.

These figures were then converted into g. of Hb/100 ml. blood with the conversion factors given by Hüffner (1894)—i.e., Hb contains 0·334% of Fe, and 1 g. of Hb = 1·34 ml. of O_2 or of CO.

(3) The colour as a percentage of the Haldane standard tube, obtained by comparison of the carboxyhæmoglobin solutions with the N.P.L. standards, using a colour comparator and a spectrophotometer.

From (1), (2), and (3), values were calculated of the concentration of Hb in g./100 ml. of blood, corresponding to 100% on the Haldane scale.

In table II are shown the iron and oxygen equivalents of the B.S.I. standard for each blood.

The colour was also determined on the spectrophotometer by complete absorption curves throughout the spectrum for each blood. The mean curve for the males and females is shown in the accompanying figure, which includes a comparison with other measurements by Kennedy (1927), Newcomer (1919), Haurowitz (1926), Heilmeyer (1932), Race (1940), and Jope et al. (1943).

From an absorption curve the value on the Haldane scale can be derived by calculation. This can be done by using the absorption at one wave-length only, but in this instance a method of calculation which gives an over-all result for the complete range of wave-lengths was used. The calculations are long and were only carried out for the means of the male and female groups. The results are shown in table III.

The oxygen and iron analyses at Oxford have been omitted from calculation of the final means, since these analyses were only carried out for the first group of male bloods.

The results as measured by spectrophotometer and comparator are in good agreement, and the average for the two instruments has been taken for the final results.

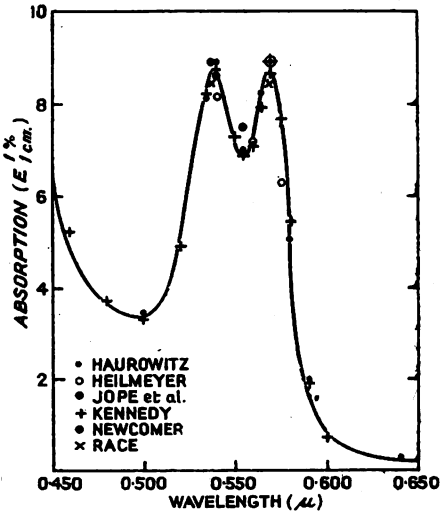
Male–Female Difference.—There is no evidence of any systematic difference between the male and female values. The comparator showed a difference of about 1%, but this was not confirmed by the spectrophotometer.

TABLE IV—NORMAL HÆMATOLOGICAL VALUES (MALES)

Observer	Hb (g./100 ml.)	Red cells (million/c.mm.)	P.C.V. (%)	M.C.V. (c.μ)	M.C.H. (μμg.)	M.C.H.C. (%)	Remarks
Price-Jones, Vaughan, and Goddard (England) 1935	14·6	5·42	46·8	85·9	26·9	31·3	Assuming 100% Hb = 13·8 g. per 100 ml.
	15·6	5·42	46·8	85·9	28·8	33·5	Assuming 100% Hb = 14·8 g. per 100 ml.
Macfarlane and O'Brien (England) 1944	16·2	5·51	47·0	85·3	28·8	33·6	Hb by direct iron estimation
King et al. (England) 1944	16·0	..	..	..	..	..	Hb by direct iron estimation
Wintrobe (U.S.A.) 1942	16·0	5·4	47·0	87·0	29·0	34·0	Composite "normal" figures for men

DISCUSSION

From the foregoing results it now seems to be established that the B.S.I. Haldane-Gowers Hb standard is equivalent to significantly more Hb than was originally supposed. If iron determination is accepted as the most reliable method for estimating Hb, the standard is equivalent to 14·8 g. of Hb. This result, obtained on 21 blood samples by independent determinations in two different laboratories, agrees almost exactly with the previous results of Macfarlane and O'Brien (1944) on 49 samples, and of King et al. (1944) on 20 samples. In the present investigation the colorimetric determinations which form the essential link between the B.S.I. standard and the iron determinations were made with the most precise instruments available in this country, and not, as in the previous work, with the Haldane hæmoglobinometer.



Absorption curve of carboxyhæmoglobin. Optical density of a 1 cm. layer of a solution containing 1 g. of Hb per 100 ml. Hb was determined by iron analysis (1 g. of Hb contains 3·34 mg. of Fe).

The oxygen-capacity determinations agree less closely with the previous work. Macfarlane and O'Brien (1944) obtained, on the basis of oxygen capacity, an equivalent value for the standard of 14·7 g. Thus the iron and oxygen determinations were in good theoretical agreement. It is true that there was a good deal of variation in the iron/oxygen relationship from one blood sample to another, and from one group of subjects to another. This variation was thought to be due to technical errors, changes in technical ability or procedure during the work, and, possibly, to a sex-difference in the relationship of iron to oxygen capacity.

In the present series, however, the oxygen-capacity determinations, made by the same method but in three different laboratories, agree fairly closely to the mean figure of 14·4 g. of Hb as the equivalent of the standard. Thus there are two discrepancies to explain: (1) the difference of 0·4 g. (or 2·7%) between 14·8 g. as determined by iron estimation and 14·4 g. as determined by oxygen capacity in the present series; and (2) the difference of 0·3 g. (2%) between the present equivalent determined by oxygen capacity and that of Macfarlane and O'Brien (1944).

It must be admitted that neither the iron nor the gasometric method is absolutely accurate. Variations in technique, in reagents, and in apparatus may, in either case, lead not only to variation between results but also to consistent errors that may affect the mean of a series of results. Such errors may explain part of the observed discrepancy between iron and oxygen figures in the present series. Part of the difference may well be due to the presence of inactive Hb in certain blood samples, which would therefore give a low oxygen capacity per unit of Hb iron. It may be significant in this respect that the CO capacity estimated after reduction of the Hb sample is very close to the theoretical figure for the oxygen/iron ratio (preliminary reduction converts any inactive Hb into a form which is capable of combining with carbon monoxide).

As regards the oxygen-capacity estimations of Macfarlane and O'Brien (1944) the reason for the difference from the present figure is not clear. It seems unlikely that the latter, derived from three independent sources in good agreement, is at fault. It is also unlikely that

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the normal blood samples examined in the 1944 series differed qualitatively from the present series to a degree likely to explain the difference. It must be assumed that, for some unknown reason, the previous oxygen-capacity determinations were too high, or the iron results too low. Since the iron results agree well both with those of King et al. (1944) and those of the present series, it seems probable that it was the 1944 oxygen method that was at fault to the extent of 2%.

A sex-difference in the relationship between the colour, iron content, and oxygen capacity of Hb was suggested by Macfarlane and O'Brien (1944) and Bell et al. (1945) but denied by Gibson and Harrison (1946). No evidence of a significant sex-difference of this sort was found in the present investigations; hence no separate definition for the standard is required for male and female blood. The problem that now arises is to decide whether the standard, for purposes of reference and calculation, should be taken as 14·8 g. or 14·4 g. of Hb. The latter is likely to be the figure derived in any future work if the Van Slyke oxygen-capacity method is used, as it usually is in the standardisation of other Hb methods. In terms of Hb mass, however, this figure is probably too low, since by iron determination 14·8 g. of Hb is obtained and 14·7 g. by CO capacity after reduction. The figure given by the iron determination, therefore, seems to be the correct one to adopt.

Such an adoption would bring the normal English hæmatological values into close agreement with those accepted in the U.S.A. Table IV shows the figures obtained by Price-Jones et al. (1935), in which they assumed that 100% of their standard was equivalent to 13·8 g. of Hb. Since it has been found that this standard has very nearly the same value as the B.S.I. standard, it is permissible to recalculate these normal values, assuming that the standard actually represented 14·8 g. When this is done, the results become very similar to those given by Wintrobe (1942) as representative of the U.S.A.

The mean figures given for red-cell count, and mean corpuscular volume for normal males, both in England and the U.S.A., are almost identical; hence the supposed difference in Hb content has always been difficult to explain. It is true that the English standard in these recalculations is based on iron, whereas most American figures are based on oxygen capacity, which may be relatively lower. Against this, however, must be set the fact that the English surveys have used the Haldane-Gowers Hb method, and it has been shown (Macfarlane 1945) that even the most experienced observers read, on the average, 4% too low by this method, a tendency that would more than compensate any difference between iron and oxygen standardisation.

As regards the difference of 4·4% between Haldane's original definition of his standard and the present value, it is probable that it can be explained almost entirely by the lower results given by the Haldane gasometric method as compared with the modern Van Slyke apparatus. Bierring et al. (1936) found a mean difference in the results of the two methods of 1·2 volumes %, an even greater difference than exists between the two definitions.

SUMMARY

The hæmoglobin values of 21 normal bloods have been measured by iron analyses and gasometric determinations carried out simultaneously at several centres. By means of the N.P.L. colour comparator and a photo-electric spectrophotometer, the hæmoglobin contents of these bloods have also been measured on the Haldane-Gowers scale.

The B.S.I. standard tube (100% Haldane) is not equivalent to 13·8 g. of hæmoglobin per 100 ml. of blood but to 14·8 g. when measured by iron analysis, or 14·4 g. when measured by oxygen capacity.

The reasons for this discrepancy are discussed.

Normal English hæmatological values, when recalculated with the new value for 100% Haldane, come into line with those published in other countries, notably the United States.

This investigation has been carried out for the Medical Research Council's subcommittee on analytical methods. The expenses incurred were partly defrayed by a grant from the Medical Research Council, to whom grateful acknowledgment is made.

Our thanks are due to Dr. C. R. Harington, chairman of the subcommittee on analytical methods, for much valuable advice; Dr. Q. H. Gibson and Miss K. Glaser, Miss Quelch, Mr. A. F. Hoffler, and Mr. W. Weedon for valuable assistance. The colour measurement of the carboxyhæmoglobin solutions was carried out at the National Physical Laboratory on behalf of the Medical Research Council.

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DISSEMINATION OF HÆMOLYTIC STREPTOCOCCI IN AIR

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THE events which initiate an epidemic seldom come to light. The following story describes events which might well have formed the starting-point of at least a series of cross-infections, but thanks to prompt action they did not. The story is also of interest for its bearing on the mechanism of such cross-infections in surgical wards and as illustrating the value of the bacteriological laboratory in controlling such infections.

It is our practice in this unit to dress all burns in a specially ventilated dressing-room or, occasionally, in a similarly ventilated saline-bath room; they are never exposed in the open wards (Bourdillon and Colebrook 1946). This, combined with a strict dressing technique and the local application of penicillin, has almost eliminated added infections by hæmolytic streptococci for $2^1/_2$ years (Colebrook et al. 1947). It is necessary, however, to be constantly on the watch for the occasional reappearance of these infections and particularly to detect the streptococci should they at any time be present in the air of the dressing-station. For this purpose it is part of our routine to expose a blood-agar plate (we call it a "settle" plate) whenever patients are being dressed. Sometimes a more severe test for the purity of the air is made with the large-model Bourdillon slit-sampler (Medical Research Council 1947), which can suck as

* Receiving a whole-time grant from the Medical Research Council.

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much as 20 c. ft. of air a minute on to the surface of a plate.

Hæmolytic streptococci are very seldom present in the air; none were found on 76 settle plates exposed between Sept. 23, 1946, and Jan. 7, 1947. On Jan. 8, 25, and 27 and on Feb. 1, however, single colonies of streptococci were obtained on the settle plates, and on Jan. 30 the slit-sampler revealed a heavier contamination of the air (76 colonies on one plate). During this period they were also grown in small numbers from the air of the saline-bath room on one occasion (Jan. 23) and from the children's ward of the unit (Jan. 31).

Subsequent investigation of these air-borne streptococci by Dr. V. D. Allison at the Central Public Health Laboratory, Colindale, showed that two distinct types were present on different occasions. Thus, the streptococci recovered on Jan. 8, 25, and 27 and on Feb. 1 from the air of the dressing-station and on Jan. 23 from the air of the saline-bath room were all type-1 strains, whereas those recovered by the slit-sampler on Jan 30 from the air of the dressing-station included a few of this type-1 strain on four of the plates, and a second type, "Imp. 19," on one other plate. This second type was also recovered from the air of the children's ward on Jan. 31.

INVESTIGATION OF SOURCE OF STREPTOCOCCI

The existence of two distinct types was not known to us at the time of the investigation; nor were we aware of any probable source among the patients or the personnel of the unit. Throat swabs of everyone who had been in the dressing-station or saline-bath room when streptococci were recovered from the air yielded none of these organisms; and all the 56 burns under treatment were streptococcus-negative, though one child had given a positive swab (later found to be an Imp. 19 strain) on Jan. 8, 11, and 13. Three subsequent swabs from this child taken during and after local treatment with penicillin had been negative on Jan. 15, 22, and 30. The source of her infection could not be traced.

Since this child's strain was identical with those grown in large numbers from the air of the dressing-station on Jan. 30, and only when this child was in the room, it seems highly probable, indeed almost certain, that the cocci were in some way disseminated in the air during the child's dressing, notwithstanding that a swab from this child's granulating wound did not yield any streptococci on this occasion. The most likely explanation is that the child's bedding became contaminated with hæmolytic streptococci when her wound was infected with that organism (Jan. 8, 11, and 13); the blankets (and possibly also other bedding) were not changed after these organisms disappeared from the wound under penicillin treatment; from these infected blankets, and/or other bedding, the streptococci passed to the crêpe bandages covering the burn, and during the removal of these crêpe bandages they were scattered into the air of the dressing-station. Direct contamination of the air of the dressing-station from the child's bedding or bed-jacket could not have happened, since these had been removed or covered with sterile sheets before she came into the dressing-station.

The suggestion that the child's bedding was the ultimate source of the Imp. 19 cocci found in the air was not merely hypothetical; it is supported by the fact that, though moist swabs taken direct from the bedding yielded no streptococci, these organisms were recovered by slit-sampler plates when the child's blankets were shaken near the machine, on two separate occasions, on the same day as she was in the dressing-station (Jan. 30). On the day following exposure of her burn to the heavily contaminated air of the dressing-station, the Imp. 19 strain was again found on the child's burns. Happily it did not infect either of the two patients who followed her, after an interval, in the dressing-station on Jan. 30.

The type-1 streptococcus found in the air on five occasions appears to have had a totally different origin. On Feb. 1 Mr. A, the surgeon who had been doing all the dressings, remembered that he had a small scabbed-over abrasion on his elbow, dating from before he joined the burns unit on Jan. 1, 1947. It had given him no trouble and, so far as he was aware, had remained perfectly dry throughout January. However, on Feb. 1 Mr. A removed the scab and cultivated the trace of serous fluid beneath it. It gave a pure culture of hæmolytic streptococcus, type 1. On Feb. 2 he swabbed his waistcoat and shirt, and on Feb. 3 his jacket and the skin of his forearm and neck. The waistcoat swab yielded hæmolytic streptococcus type 1; the others were negative. The elbow lesion had been treated with penicillin cream on Feb. 1 and promptly healed.

How did the streptococcus reach the air of the dressing-station from the scabbed-over lesion on Mr. A's elbow? He had never worn his waistcoat during dressings, and his clothing had always been covered with a sterile gown and canvas overshoes. The gown, however, did not give complete cover, because Mr. A is very tall and the gowns are often imperfectly closed at the back. His forearms were exposed during dressings; so there was opportunity for friction between the forearm skin and his gown. It is also possible that, though we detected hæmolytic streptococci only on his waistcoat by our casual swabbing of a small area with a moist swab, a more efficient method of extracting dust from the clothing, like that used in vacuum-cleaning, might have revealed the presence of streptococci also on his shirt, trousers, &c. (see below). In that case the movement of his garments might well have been responsible for the small number of streptococci isolated from the air of the room. In this connexion it will be remembered that Hare (1941) reported finding hæmolytic streptococci on the clothing of healthy throat carriers.

It is therefore suggested that contamination of the air by this type-1 strain was due, in the first place, to imperceptible leakage of serous fluid from Mr. A's lesion, the fluid drying into powdery scales on his forearm and being rubbed off either by the sleeves of his gown or by his clothing.

None of the 42 wounds dressed by Mr. A on the days when his type-1 strain was found in the air of the dressing-station or the saline-bath room acquired this organism. This and the similar fact noted in connexion with the Imp. 19 strain of the child were probably due to the constant decontamination of the air of the dressing-station by the forced-ventilation system, by which the air of the room is completely changed every few minutes (Bourdillon and Colebrook, 1946).

SUMMARY

Hæmolytic streptococci recovered from the air of a dressing-station were of two types: type 1 and type Imp. 19.

The evidence suggests that the type-1 strain came indirectly from a small scabbed-over lesion on the elbow of the surgeon doing the dressing (perhaps from his clothes); and that the Imp. 19 strain was scattered in the air during the removal of bandages from a burn which was not at the time infected with that organism, the bandages having become contaminated from the child's bedding.

NOTE ON THE DETECTION OF PATHOGENS, ETC., ON CLOTHING BY "HOOVERING"

In 1944 Dr. R. B. Bourdillon suggested to one of us (L. C.) that a slit-mouthed flexible tube fitted to the air-inlet of the slit-sampler would enable us to sample a much larger amount of dust from clothing, bedding, &c.,

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than is obtained by merely swabbing it with a moist swab. Dr. Bourdillon also made the appropriate fittings at that time, but we had not previously used it. After the events recorded in this paper we carried out some trials as follows:

(1) Four streptococcal throat carriers, one of whom, A. B., had also a streptococcal infection of an old burn on his leg, gave the following results:

In the case of A. B. "hoovering" bedding, dressing-gown, &c., gave 42 colonies of hæmolytic streptococci, whereas moist swabs of the same articles gave none; but unfortunately these swabs were taken after the "hoovering," so that it is possible, though not likely, that a large part of the contaminated dust had been removed. Of the 42 colonies obtained by "hoovering," 10 were tested for type. All belonged to type II, which was the type present in the patient's throat and on the leg.

Of the other three carriers, C. D., aged 2 years, gave no hæmolytic streptococci by moist swabbing (swabs before the "hoovering"), but 8 colonies were grown by the "hoovering" test. All the 8 colonies were of the Imp. 19 strain present in the child's throat.

Another child, E. F., yielded one colony of hæmolytic streptococci on "hoovering" the bedding, and none by swabbing.

The fourth child gave one colony by swabbing and none by "hoovering."

(2) In the case of 8 other people with negative throat swabs, 5 of whom were working in the wards in more or less close contact with streptococcal infections, one or two colonies of hæmolytic streptococci were recovered by "hoovering" the clothing from 3 but none from the others. Tests by swabbing were not made in these cases.

So far as it goes, therefore, the evidence suggests that "hoovering" clothing, bedding, &c., is much more likely to detect hæmolytic streptococci than moist swabbing, and that it may prove a valuable aid in the future investigation of cross-infections.

We wish to thank Dr. Allison, whose help in the typing of the streptococci made this investigation possible; Dr. Bourdillon, who taught us to use the slit-sampler and suggested the "hoovering" device; and Mr. Michael Hood for technical assistance.

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CALCIFEROL IN THE TREATMENT OF CHILBLAINS

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CALCIFEROL in high dosage has been widely advertised as effective in the treatment of chilblains. Since this therapy is hazardous unless controlled by estimations of blood-calcium (especially diffusible calcium) and of renal efficiency, it seemed important to assess its effects on chilblains.

The incidence of chilblains during last winter in a group of patients receiving calciferol in large doses for other reasons was determined and compared with the incidence in a group not receiving calciferol.

Material.—The test group (A) consisted of 103 patients (36 men and 67 women) with either lupus vulgaris (92 cases), sarcoidosis (6 cases), tuberculosis verrucosa cutis (3 cases), lupus erythematosus (1 case), or erythema induratum (1 case). Their mean age was 46·3 years (variation 21 to 70) with a standard deviation of 9·2. This group received calciferol daily in tablet form by mouth in doses of 50,000–150,000 I.U. (tab. 'Ostelin,' high potency, Glaxo) for various periods but consistently through the winter months from September, 1946, to March, 1947 (with four exceptions who took the tablets for a shorter time during this period, one for a month, one for two months, and two for five months). The mean individual doses were as follows:

INCIDENCE OF CHILBLAINS IN RELATION TO TREATMENT WITH CALCIFEROL

—	Sex	Experimental group A	Control group B	Control group C
No. in group	M	36 (35%)	19 (39%)	44 (40%)
	F	67 (65%)	30 (61%)	66 (60%)
Total		103	49	110
Mean age (years)		46·3	42·4	43·4
Standard deviation		9·2	15·9	13·1
No. with lupus vulgaris		92 (89%)	45 (92%)	Nil
No. who had had chilblains before 1946–47 winter	M	5 (4·8%)	1 (2·0%)	9 (8·2%)
	F	19 (18·4%)	4 (8·2%)	26 (23·6%)
Total		24 (23·2%)	5 (10·2%)	35 (31·8%)
No. who had chilblains for the first time in 1946–47 winter	M	7 (6·8%)	3 (6·1%)	6 (5·4%)
	F	7 (6·8%)	4 (8·2%)	4 (3·6%)
Total		14 (13·6%)	7 (14·3%)	10 (9·0%)
Total no. with chilblains in 1946–47 winter	M	9 (8·7%)	4 (8·2%)	10 (9·0%)
	F	20 (19·4%)	8 (16·3%)	21 (19·1%)
Total		29 (28·1%)	12 (24·5%)	31 (28·1%)
			Standard error, 8·7	

	Mean individual dose (million I.U.)	*Variation* (million I.U.)	*Standard deviation*
Patients with chilblains	21·4	2·0–42·9	9·2
Patients without chilblains	22·2	2·8–40·2	8·1

The controls were in two groups: group B consisting of 49 patients (19 men and 30 women) with either lupus vulgaris (45 cases), tuberculosis verrucosa cutis (3 cases), or erythema induratum (1 case); and group C of 110 patients (44 men and 66 women) attending primarily for skin conditions other than chilblains or lupus vulgaris. The total control group therefore consisted of 159 patients, none of whom was given calciferol.

Results.—The accompanying table shows that 28·1% of the 103 patients given calciferol developed chilblains, and of the 159 patients not given calciferol, 24·5% in group B and 28·1% in group C developed chilblains. There is no statistically significant difference between the test and control groups as regards the incidence of chilblains. It is thus clear that, in the conditions of this test, a patient receiving calciferol is as liable to chilblains as one who is not receiving it.

Comment.—These results suggest that calciferol is ineffective in preventing chilblains. Further, calciferol appears to have no effect in the treatment of chilblains, since chilblains developed and persisted about the same length of time in all the groups.

As treatment with calciferol in high dosage is not without danger, it would be as well if its use for this purpose were discontinued.

I am grateful to Dr. J. T. Ingram and Dr. F. F. Hellier for allowing me to carry out this investigation on their patients.

EACH bed in the new tuberculosis wards at Anlaby Road Hospital, Hull, has been equipped with a pillow-wireless, according to the Hull *Daily Mail* (Oct. 16).

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Medical Societies

BRITISH ORTHOPÆDIC ASSOCIATION

THE annual meeting was held in Manchester on Oct. 24 and 25 under the presidency of Mr. GEORGE PERKINS.

Recurrent Dislocation of the Shoulder

Mr. H. OSMOND-CLARKE described a capsulorrhaphy for recurrent dislocation of the shoulder which he called the Putti-Platt operation. This consisted in a wide approach to the front of the joint with division of the coracoid, subscapularis tendon, and capsule. The distal cut edge of the subscapularis tendon was sewn to the neighbourhood of the anterior lip of the glenoid, and the proximal portion of the tendon was made to overlap the suture line. The coracoid was repaired and the wound closed.

Mr. J. C. ADAMS had investigated the results, after two years or more, of 114 out of 159 operations for recurrent dislocation of the shoulder in the Royal Air Force during 1940–45. He said that 21 recurrences had taken place after 59 Nicola operations, and 2 after 37 Putti-Platt operations. The intervals before recurrence varied between four months and five years, averaging twenty-two months. Among 79 shoulders adequately explored, the glenoid labrum was found detached in 69 and soundly attached in 10. Adequate radiography of 68 patients revealed a posteromedial defect in the humeral head of 56; an anteroposterior view with the limb rotated inwards through 60–70° was advised. The range of movement was almost full after Nicola's operation; lateral rotation was often diminished after Bankart's operation, and rather more so after the capsulorrhaphy. The relatively free range after Nicola's operation was perhaps a factor in recurrent cases, which did not always show atrophy of the reattached tendon. The good results of the other operations were attributed to the fibrous tissue formed in the front of the capsule, which limited lateral rotation.

Mr. A. L. EYRE-BROOK gave a detailed analysis of 20 consecutive cases operated on by the anteromedial approach. These lesions were found: anterior detachment of the glenoid labrum (Bankart's lesion) alone in 6 cases, a posteromedial defect in the humeral head alone in 3 cases, a combination of these two defects in 10 cases, and detachment of the subscapularis from the lesser tuberosity in 1 case. The bony defect was best revealed preoperatively by radiography from above with the film in the axilla and the arm laterally rotated through 70°. Radiography often disclosed also a bony subglenoid outgrowth in cases of Bankart's lesion. In cases showing this lesion at operation, a modified Bankart's operation was performed. In cases not showing this, but having a defect in the humeral head, multiple osteotomy of the coracoid had been performed (2 cases), and more recently the application of an iliac graft to the front of the scapular neck. After operation the arm was bandaged to the side for four to six weeks. Work was resumed after a further six weeks. In 12 cases followed for periods of six months to four years, no recurrence had been found.

Mr. A. B. PAIN had examined the case-records of 43 operations for recurrent dislocation of the shoulder in 33 patients treated in the Leeds area during the preceding fifteen years. Of the patients, 1 had bilateral operations, 7 others had two operations, and 3 had as many as three operations each; 6 were epileptic. Among 28 patients traced, seven different types of operations had been performed as follows (recurrences in parentheses): Clairmont 1 (1), Henderson 13 (9), subscapularis tenotomy 3 (1), Nicola 12 (4), Bankart 2 (1), capsular plication 1 (0), bone block 4 (0). Recurrence took place at any time up to seven years after operation, but in 12 out of 18 instances it was within a year—in 6 of them within three weeks.

Other Papers

Prof. JACQUES LEVEUF, in a paper on the *Treatment of Acute Osteomyelitis Viewed from the Anatomical and Physiological Basis*, expressed the view that in hæmatogenous osteomyelitis the first bony lodgment of the staphylococcus is not usually the metaphysis but the neighbourhood of the entry of the perforating artery, where a cortical abscess forms, with usually a very small lamellar sequestrum. Spread is mainly towards the surface, but also along the artery and its branches, producing further cortical lesions and occasionally medullary ones. Professor Leveuf, who has practised plaster-of-paris immobilisation in this disease for twenty years, condemns bone operations in the acute stage, and especially metaphyseal drainage. The soft-tissue abscess should be drained between the fifteenth and twentieth day; formerly the wound was left widely open, but now, with the aid of penicillin, it is closed forthwith.

Prof. S. L. BAKER, in speaking of the *Histology of Callus*, stated that the first sign of bone appeared within the first week in an area of gelatinous œdema in the mass of young connective tissue which invades the hæmatoma about a fracture.

This bone is of a type called woven bone, because of the irregular arrangement of the fibres, which with a connecting substance form the osteoid matrix, in distinction from lamellar bone, in which the fibres have a parallel arrangement. Whereas woven bone can be laid down rapidly in connective tissue, lamellar bone forms slowly and can only be laid down on a surface. Woven bone forms about blood-vessels, and so the orientation of its trabeculæ is determined by the vascular arrangement, whereas that of the trabeculæ of lamellar bone is determined by the stresses to which it is submitted. Woven bone is usually replaced slowly by lamellar bone. The formation of cartilage in callus appears to depend largely on movement, being frequent after rib fractures and in animals. Cartilage sometimes forms a ring about the fracture and may result in pseudarthrosis, but commonly it is replaced gradually by bone. Callus is no respecter of the periosteum, often passing well outside it.

In certain rare instances, said Professor Baker, especially fragilitas ossium, there is a prodigious formation of callus which may be taken for sarcoma. Dr. J. F. BRAILSFORD and Mr. B. L. MCFARLAND confirmed this danger.

Mr. ROLAND BARNES reported on 22 cases of *Paraplegia in Cervical Column Injuries*, which he subdivided into (1) flexion injuries (dislocation 8, crush fracture 4, acute retropulsion of an intervertebral disc without bone injury 3), and (2) hyperextension injuries (dislocation 1, injury of arthritic spine 6). He believed that with acute retropulsion of an intervertebral disc cerebrospinal-fluid block called for emergency laminectomy and not merely skull traction. With paraplegia following hyperextension injury of an arthritic spine there was little or no evidence of bone injury. These patients were all more than fifty years old. A complete tear of the anterior common ligament had been produced in 1, and it seemed probable that not only was the stiff extended arthritic spine unduly prone to hyperextension injury, but the cervical lordosis and often associated thoracic kyphosis would aggravate the consequent traction injury to the spinal cord, which seemed a probable cause of the paraplegia. Prof. GEOFFREY JEFFERSON, F.R.S., agreed with what had been said but had an open mind about crediting laminectomy with the improvement which sometimes followed it.

Mr. D. LL. GRIFFITHS advocated the following steps in the *Management of Acute Ischæmia in an Injured Limb.*

(1) Adequate general investigation, including arterial blood-pressure and blood hæmoglobin estimation.

(2) Removal of all possible sources of external pressure.

(3) Attention to the patient's general condition, with special reference to maintenance or restoration of a satisfactory blood-pressure.

(4) Reduction of the associated fracture, if any; this may assist the collateral circulation but should be attempted only once.

(5) Operative exploration of the artery, except in cases of over twenty-four hours' duration in the lower limb, or in cases showing obliteration of both anterior and posterior tibial arteries. Preliminary arteriography is helpful. Complete division demands ligation; incomplete division provides an opportunity for a trial of arterial suture; bruising of a length of artery calls for resection; no operation should be performed on the artery if it is occluded by spasm without any obvious arterial injury.

(6) Paralysis of the cervicothoracic or lumbar sympathetic system by local infiltration.

(7) Other measures to improve the collateral circulation: slight elevation or slight depression of the limb, as suits the patient's comfort; cooling the limb, but without the use of ice; warming the patient; administration of morphine, alkalis, and

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penicillin. Tobacco is usually condemned, but alcohol may help.

Mr. JOHN CHARNLEY gave a discourse, illustrated by models, on some of the basic mechanical principles used in the *Reduction and Splinting of Fractures.*

Mr. C. H. CULLEN discussed *Causalgia* on the basis of 24 cases he had seen during the war. Of 17 in which sympathetic block was successfully achieved with 2% procaine ('Novocain'), as shown by peripheral loss of sweating, 14 were completely relieved temporarily. For such, sympathectomy was the treatment of choice; in the 8 patients submitted to it, the results were uniformly good, except that 1 patient, in whom part of the stellate ganglion was spared, was not completely cured. Radiotherapy was less successful than sympathectomy, and was reserved for cases not responding to sympathetic infiltration.

Mr. T. J. FAIRBANK spoke on *Fracture-subluxation of the Shoulder.* Among 115 cases of fracture about the shoulder, he had found 12 with radiologically demonstrable downward subluxation of the humeral head; in 11 of these it was a complication of fracture of the neck of the bone. Clinically a groove could be felt between the acromion and the humeral head, which could usually be abolished by lifting the humerus actively or passively, or by recumbency. In the normal subject little downward subluxation occurred except during anæsthesia, and muscle tone appeared to be the main factor preventing it. At follow-up, a year after injury, the subluxation had sometimes disappeared, but it sometimes persisted for three years or more. Of the patients, 9 had been treated for their fractures with collar-and-cuff slings and 3 with abduction frames. It was suggested that, in the treatment of fracture of the humeral neck, a triangular sling is preferable to a collar-and-cuff, and that if abduction is necessary a plaster-of-paris spica should be used. Sir REGINALD WATSON-JONES considered it important to distinguish between subluxation due to the original violence and that due to diminished muscle tone.

In considering the *Treatment of the Unreduced Pathological Dislocation of the Hip from Septic Arthritis in Infancy,* Mr. A. F. BRYSON excluded patients aged more than twelve months at the time of the acute illness. In most it occurred in the first nine months. His 16 cases were all unilateral, and 15 were operated upon. One underwent an unsuccessful Colonna's arthroplasty. Of 3 treated by osteotomy, 1 secured stability, but the other 2 continued to show progressive shortening, flexion, and adduction. Arthrodesis was much the best procedure. Eleven patients were so treated; bony fusion occurred within a few months in 7 of them, and after subsequent osteotomy in another. Operation should be delayed till the age of twelve or thirteen years, because of the great amount of activity possible till then and because earlier bony fusion is not only difficult to obtain but does not fully prevent subsequent flexion and abduction deformity. Preliminary weight traction has been found of little value in diminishing shortening, but freeing of the upper end of the femur at operation allowed considerable correction of real shortening, which in 1 case was reduced from 3½ in. to 1 in. The denuded bone surfaces were secured with Platt's miniature tri-fin nail. Only 1 patient had complained of pain in the back—eighteen months after an operation performed at the age of fourteen years—but she claimed to have walked 40 miles in a day. Professor LEVEUF advocated arthroplasty in such cases, even although unilateral. Mr. R. I. STIRLING considered that a shelf operation had a place in the treatment, in order to limit shortening before the best time for arthrodesis had arrived.

Miss E. L. WILLIS summarised the *End-results in Fractures of the Femoral Neck* in 192 cases treated in the university department of orthopædics at the Manchester Royal Infirmary, with a death-rate of 8% within three months of injury. Out of 113 patients with subcapital and transcervical fracture, 50 were seen two or more years after injury: 22 had good results and 15 poor; 13 showed avascular necrosis of the femoral head. Of 74 fractures treated by Smith-Petersen nailing, 41 showed radiological union. Of 79 basal and pertrochanteric fractures, 51 were treated by well-leg traction, with union in 43. There were 23 good clinical results among 28 patients examined more than a year after injury.

Reviews of Books

Radium Dosage

The Manchester System. Editor: W. J. MEREDITH, M.SC., F.INST.P., physicist to the Christie Hospital and Holt Radium Institute, Manchester. Edinburgh: E. & S. Livingstone. 1947. Pp. 124. 15*s.*

THIS book presents in one volume a complete dosage system for mould, intracavitary, and interstitial gamma-ray radium therapy. By means of dosage tables and distribution rules it attempts to solve the three problems of radium therapy: how much radium should be used; how it must be arranged; and how long treatment should last. It is based on papers published since 1934 by the staff of the Christie Hospital and Holt Radium Institute, including Ralston Paterson, M. C. Tod, H. M. Parker, F. W. Spiers, S. K. Stephenson, and W. J. Meredith. These papers are well known to physicists and radiotherapists, and the book will replace well-thumbed "reprints" in all departments where radium therapy is practised.

Milk and Food Sanitation Practice

H. S. ADAMS, B.SC., chief, Bureau of Environmental Hygiene, Minneapolis; lecturer, School of Public Health, University of Minnesota. New York: Commonwealth Fund. London: Oxford University Press. 1947. Pp. 311. 18*s.*

THIS well-written book places the whole question of food protection in a modern setting.

The first section, which deals with milk sanitation, gives an interesting survey of the steps taken in the United States to improve the quality of market milk, and shows that great progress has been made in pasteurisation and its acceptance by the public. Mr. Adams gives minute instructions about the standards of milk production, also devoting a chapter to unpleasant flavours in milk and means of avoiding them. Arguments against pasteurisation are analysed and demolished. The second and shorter section deals more broadly with food control, discussing inspection of food, the hygiene of the worker, the safety of the water-supply, protection from contamination, and the war against the perpetual enemies of food—insects and rodents.

The book is a valuable statement of the modern attitude towards food and milk; and is besides a lesson to us in Great Britain on the rather tiresome subject of how far we lag behind in these matters.

Atlas of Cardiovascular Diseases

IRVING J. TREIGER, M.D., assistant professor of medicine, University of Illinois, Chicago. London: H. Kimpton. 1947. Pp. 180. 50*s.*

IN this atlas the anatomy of the normal heart and the pathology of the diseased heart are shown in photographs of specimens and in radiograms; and as a rule the corresponding cardiographic changes are also illustrated; moreover, each common disorder of the cardiovascular system is represented by a case of which brief clinical details are given. The study of photographs, however good—and those in this atlas are exceptionally good—is not an effective substitute for the examination of the material itself in the post-mortem room, nor will the written matter here take the place of a textbook; but in so far as the correlation of first-class radiograms with morbid anatomy, as shown in photographs, can help the student to a clear conception of cardiovascular disease, this atlas provides excellent instruction.

Experimental Physiology for Medical Students (4th ed. London: J. & A. Churchill. 1947. Pp. 299. 18*s.*).—Prof. D. T. Harris notes that in the six years which have passed since the last edition of his book there have been great advances in the study of electronics, especially during the war years. Students nowadays have a first-hand knowledge of radio devices, and he has therefore included in the new edition such simple assemblies as are thought to possess definite advantages—for example, a robust micro-ammeter with simple amplifier instead of a highly sensitive and costly galvanometer. This has made it possible to replace the older experiments on nerve by simple exercises illustrating the electrochemical view of the propagation of nerve impulses. The book remains a standby for the student to use in conjunction with his theoretical textbook.

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THE LANCET

LONDON: SATURDAY, NOV. 29, 1947

Ambulances

RELIABLE arrangements for moving patients by ambulance are an important element in any medical service. Little is heard of the preparations for the ambulance system in the National Health Service, but its organisation is being considered.

Ambulance services in this country were largely amalgamated during the war, but they have now been restored to their pre-war owners and show a tendency to revert to their pre-war standards. Is this necessarily a good thing? Ought we not to use the opportunity for a fresh approach? In greater London, for example, before the war there were various ambulance services. The greatest was that of the London County Council, operating within the boundaries of the county. Outside those impassable boundaries there were many small ambulance services owned by the boroughs and the counties. Borough ambulances could take the patient from the borough to any hospital but not vice versa, and county ambulances were to be used only for the county hospitals. Rates of payment were highly diverse: some ambulances were free, while some had a mileage rate, and the patient proceeding to a voluntary hospital in a L.C.C. ambulance had to pay cash down or be taken willy-nilly to a L.C.C. hospital. Finally there were private ambulances—more particularly those of the Joint Committee of St. John and the Red Cross—which disregarded all boundaries and charged a moderate fee.

In the new health service the ambulances will presumably be free; so one problem at least will disappear. Indeed, the L.C.C. has already dropped its charge for journeys to hospital when the hospital calls the ambulance. But what of the boundary question? Presumably borough and county boundaries will disappear, for in a national service they will have no significance. Will they be replaced by regional boundaries? Since it has been said that regional boundaries are to be no bar to the movement of patients, presumably ambulances will be able to cross them. Up to this point the new system must of itself be an improvement, provided the larger ambulance services do not acquire a larger bureaucracy to hinder them. But there remains a risk that the present speed of dealing with cases will be accepted as a standard to maintain rather than as a basis for improvement. Despite the somewhat rosy statistics which are published, we have heard doctors complain of interminable delays in obtaining ambulances. Further information would be welcome, but it seems at least to be clear that an hour's delay before the ambulance starts is not unusual at any time of year—particularly at the "peak" hours of midday and evening—and that in winter the delay is often much greater. Admittedly, if the case is one of accident or can be certified as "life or death" an accident ambulance can be called, and this will start more or less at once. But the bulk of patients needing immediate admission to hospital are not in this desperate plight; so, though they may be very ill and the anxiety of their friends and doctor very great, they have to wait—to their medical disadvantage where (in pneumonia for example) active treatment should begin at once. Presumably this is because there are not enough ambulances to go round, and because old ones cannot be replaced. Is it, however, certain that a sufficient expansion is envisaged not only to ensure that patients shall not be kept waiting unduly, but also to meet the added requirements that the National Health Service will bring? There are various concealed requirements which rationalisation of hospital work will reveal more clearly. Thus it is evident that something will have to be done about the patient who needs outpatient treatment but is unable to travel to and from hospital, either because of his physical disability or (in the country) because public transport is lacking. Nowadays such a man either goes without the treatment or is given a hospital bed which could be put to better use. It looks as though the scope of the ambulance service must be enlarged to include the wide use of sitting ambulances, to work in connexion with outpatient departments.

Running a large ambulance service is a technical job which few are qualified to undertake; and it is not for the inexperienced to suggest how these necessary improvements should be made. The county health authorities, however, have great experience, and they are to bear the whole burden in the future. We trust that they are dissatisfied with the present service and are planning boldly for something better.

Cholera and Hysteria

CHOLERA inspired the first attempt at international regulation of quarantine procedures, and the Egyptian cholera outbreak has revealed the flimsy foundation on which a hundred years of such efforts have been based. Since the first quarantine conference in 1851 those concerned with international quarantine have had a twofold purpose: on the one hand, they have sought to promote measures which would prevent the spread of disease from country to country, and on the other hand they have tried to obtain agreement on an upper limit of severity for such measures, which would prevent unnecessary interference with trade and travel. In the Egyptian outbreak the first of these objectives—the prevention of international spread—seems to have been achieved: for cholera has not so far appeared in any other country west of the Persian Gulf, and further epidemic extension is unlikely now that the incidence in Egypt has declined and the Mecca pilgrimage has been concluded. It is the second objective—the avoidance of undue dislocation of trade and travel—which has not been attained, and the story of the failure can be read between the lines of the official Weekly Epidemiological Record of the World Health Organisation and in the press.

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For preventing undue interference with international traffic three things are necessary: (1) there must be early and accurate information about the onset and spread of the epidemic and the measures taken by the country of origin; (2) other countries must refrain from measures beyond the maxima laid down by the International Sanitary Conventions; and (3) the measures taken against the infected country must be promptly reported. Though many governments deserve great credit for the way they have fulfilled their obligations, far too many others have failed under one or more of these heads. As regards notification, Egypt was prompt to report the outbreak as soon as it was bacteriologically confirmed; but lack of information about its progress and spread was certainly the reason for some of the excessive measures taken against her. It was also unfortunate that there was delay on the part of British military in notifying the Egyptian authorities of four cases in the Canal Zone—though these in no way supported the original allegation of importation from that zone. Again, some neighbouring countries do not seem to have realised the value of negative official reports as a means of countering false rumours, such as those alleging that cholera had arrived in Greece, Italy, and Turkey. (The excellent reports from Saudi Arabia concerning the pilgrimage were a notable exception.) But a second and greater failure lay in the imposition of control measures far in excess of those described in the conventions. Though the quarantine committee of the World Health Organisation Interim Commission had held a special emergency meeting, under the chairmanship of Dr. P. G. STOCK, and had specifically stated that the measures against cholera laid down in the conventions in force were adequate, certain countries—and not always those most at risk—actually closed their frontiers to all passengers and goods coming from Egypt. The process was a gradual one, in the nature of a vicious circle. At first measures within the conventions were imposed, such as medical examination and surveillance of passengers and prohibition of importation of fresh food. Then alarmist rumours and press reports, not always accurate, of what other countries were doing roused public opinion, before which some health authorities seem to have given way. Thus it is reported that Italy eventually decided that arrivals from Egypt by air should be held under observation in a hotel in Ostia; the local inhabitants erected barricades, and the bus containing the travellers was turned back after something approaching a riot. France, after a short interval, abruptly forbade admittance to passengers and even mail from Egypt, not only to her metropolitan territory but to all her dependencies. Greece, after quite reasonably requiring sea and air traffic from Egypt to call at specified places, ended by suspending all such traffic. Austria prohibited the importation of all foodstuffs, not only from Egypt but from eight countries "threatened" with cholera. Other countries prohibited the import not only of foodstuffs but of Egyptian cotton, oblivious of the fact that they had been importing for years jute from Bengal and rice from China and Indo-China—the main endemic and epidemic centres of cholera—without any evil consequences: at one point it was even reported that ships could not be chartered to take to Egypt the Chilean nitrates on which the crops depend. In the third place, many of these measures taken against Egypt were not communicated promptly, or even at all, to the World Health Organisation at Geneva, as required by the conventions. Hence the sea and air lines were unable to learn from an official central authority what they would be allowed to do.

Cholera has been called, in quite a different sense, the "disease of fear"; and certainly fear of it has caused incalculable trade and traffic losses which were largely needless. The lesson will have to be studied carefully when the time comes for the World Health Organisation to revise the conventions. It seems clear, however, that it was not the conventions that were at fault, and that what we have witnessed was a partial return to the "quarantine of the jungle."

The Enigma of Hæmophilia

WHY does hæmophilic blood not clot when it is shed? What part of the clotting reaction has failed, and can the defect be remedied by treatment? No completely satisfying answer to these questions has yet been found, but research in many countries has clarified our ideas.

It is agreed that the defect in hæmophilia lies in the failure of conversion of prothrombin to thrombin in the presence of ionised calcium and thrombokinase—the first clotting reaction. Two explanations of this failure have been most popular. The first, associated particularly with the researches of FONIO, is that the abnormality lies in the platelets; it is thought that the blood-platelets are abnormally resistant to disintegration and fail to provide the necessary thrombokinase. This hypothesis has in the past received much support; HOWELL, for example, considered that there is in hæmophilia an inherited defect of the platelets or of the megakaryocytes from which they are derived. The second explanation invokes a deficiency in the plasma of thromboplastin (thrombokinase), the platelets being normal. As long ago as 1905 SAHLI noticed that hæmophilic blood will clot promptly if a small amount of normal plasma is added, and in 1927 FRANK and HARTMANN [1] underlined this observation by pointing out that the coagulation-time of hæmophilic blood can be restored to normal by mixing with normal plasma. PATEK and TAYLOR,[2] and BENDIEN and VAN CREVELD [3] isolated globulin fractions of plasma that had this restorative property; and in 1939 HOWELL,[4] abandoning the platelet hypothesis, stated that these results provide real evidence for the view that blood plasma normally contains a specific substance that accelerates the clotting process, and that this substance is deficient in the plasma of hæmophilic patients. HOWELL proposed the name "plasma thromboplastin" for this substance. It is essentially the same as MORAWITZ's "thrombokinase"; but this name suggests a protein substance of enzymic nature, whereas HOWELL was able to show that thromboplastin can be freed of protein, and MERTZ, SEEGERS, and SMITH [5] produced evidence that the reaction, prothrombin + $Ca^{"}$ + thromboplastin = thrombin, is not

1. Frank, E., Hartmann, E. *Klin. Wschr.* 1927, **6**, 435.
2. Patek, A. J., Taylor, F. H. L. *J. clin. Invest.* 1937, **16**, 113.
3. Bendien, W. M., van Creveld, S. *Acta med. scand.* 1939, **99**, 12.
4. Howell, W. H. *Bull. N.Y. Acad. Med.* 1939, **15**, 3.
5. Mertz, E. T., Seegers, W. H., Smith, H. P. *Proc. Soc. exp. Biol., N.Y.* 1939, **42**, 604.

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enzymic but a true chemical combination. The name "thromboplastin" is therefore more accurate. HOWELL also noted in support of the plasma-deficiency theory some experiments by GOVAERTS and GRATIA [6] suggesting that hæmophilic platelets only exhibit exceptional stability in hæmophilic plasma, and that in normal plasma they behave normally. In other words, the platelets themselves are normal.

This theory, though satisfactory in many ways, still leaves important points unexplained. How is the plasma thromboplastin brought into action? How is intravascular clotting avoided? Are the platelets denied all part—as LENGGENHAGER [7] has suggested—in the clotting process? In some recently published experiments QUICK [8] attempts to answer these questions. He starts from the observation of BRINKHOUS [9] that in hæmophilic blood prothrombin is only slowly converted to thrombin, and that after such blood has clotted much prothrombin remains in the serum. QUICK uses the consumption of prothrombin, rather than the coagulation-time of the blood, as a measure of the completeness of the first coagulation reaction. He confirms the finding that hardly any prothrombin is consumed in the clotting of hæmophilic blood, whereas in normal blood 80–85% has been converted to thrombin an hour after clotting. But the prothrombin in hæmophilic blood can be converted to thrombin just as readily as that of normal blood if thromboplastin is added. Either normal plasma or thromboplastin prepared from rabbit brain tissue is effective; but of course plasma thromboplastin does not cause clotting in vivo, whereas tissue thromboplastin does. In order to explain this difference, QUICK again explored the rôle of the platelets. An extract of platelets only slightly accelerates the clotting-time of recalcified oxalated plasma, suggesting that the platelet extract provides no significant amount of thromboplastin. Now in a platelet-free plasma conversion of prothrombin to thrombin is very slow; nevertheless such plasma added to hæmophilic plasma will still restore the normal conversion of prothrombin; in other words thromboplastin is still present. If the hæmophilic plasma is freed as far as possible of platelets by rapid centrifuging, then the addition to this plasma of platelet-free normal plasma will not bring about the relatively complete conversion of prothrombin to thrombin. QUICK explains this by saying that the thromboplastin in normal plasma exists in an inactive form, "thromboplastinogen," which is activated by an enzyme released by the platelets on disintegration. He thus restores the platelets to an active part in blood coagulation; and the defect in hæmophilia is that when platelets disintegrate, and liberate their activator, there is insufficient thromboplastinogen in the plasma to allow formation of enough thromboplastin for significant conversion of prothrombin to thrombin. But the state of affairs is not quite so straightforward, for it has repeatedly been noted by direct observation of shed hæmophilic plasma that platelets do not in fact agglutinate or disintegrate properly. QUICK quotes the findings of PINNINGER and PRUNTY [10] that proper agglutination and disintegration of platelets depends on the formation of a minimal amount of thrombin. In normal blood some thrombin is formed when plasma comes into contact with a foreign surface, but this does not happen in hæmophilic blood.

All the newer evidence is thus in favour of the hypothesis that hæmophilia is a congenital deficiency of plasma thromboplastin, and that all the observed consequences—failure of the blood to clot, non-conversion of prothrombin to thrombin, and even the unusual stability of the platelets—can be traced to this deficiency. It is thus clear that in treatment the provision of thromboplastin is the only correct method. This can be done by transfusing with normal blood or plasma, or by giving intravenously the thromboplastin concentrate known as antihæmophilic globulin, and so restoring the plasma to normal, even if only temporarily. A good case can be made out for giving transfusions before any operative measure, such as tooth-extraction. Since thrombin is the main hæmostatic agent, it is a reasonable contention of QUICK's that the measure of conversion of prothrombin to thrombin gives a better estimate of the likelihood of bleeding than does the simple coagulation-time. For local use thrombin preparations are the first choice.

There are still points to be cleared up, such as the mechanism of the clotting of hæmophilic blood without consumption of prothrombin; and more evidence is needed about the interaction of platelets and thrombin. But much progress has been made, and this should be reflected in simplification of the treatment of hæmophilia.

6. Govaerts, P., Gratia, A. *Rev. belge Sci. méd.* 1931, **3**, 689.
7. Lenggenhager, K. *Schweiz. med. Wschr.* 1946, **76**, 411.
8. Quick, A. J. *Amer. J. med. Sci.* 1947, **214**, 272.
9. Brinkhous, K. M. *Ibid*, 1939, **198**, 509.
10. Pinninger, J. L., Prunty, F. T. G. *Brit. J. exp. Path.* 1946, **27**, 200.

Service Medicine

No army designed for defence can hope to be fully prepared for war. The date of the conflict, its form, its place, and its scope—these determine the army's constitution, and they can only be guessed. But the guess should take full account of past experience.

The testimony of civilian doctors who worked in or with the Services during the war carries weight because they were in a position to judge the effect of the Service setting on the exercise of their skill. In the first of his Croonian lectures to the Royal College of Physicians last week Dr. E. R. BOLAND offered some friendly criticism on these lines. As a consultant with Allied Force Headquarters, C.M.F., he was impressed with the wastage of medical man-power by the maintenance of separate medical departments for each of the Armed Forces. In voicing the claim for a unified medical service, which has been repeatedly made in these columns,[1] BOLAND admitted that each of the Services has particular problems and needs; but these, he holds, could be met through special formations within the main service. Unification is in fact being considered, but he is not sanguine about the outcome; and he urges that at least medical procedure and documentation should be standardised. In war-time each of the Services uses the medical organisation of the others as occasion demands; and those who served will recall the irritation and confusion caused, particularly at hospital level, by differences in procedure between the three Forces. There will

1. See *Lancet*, 1946, i, 349; *Ibid*, 1946, ii, 421; *Ibid*, p. 533; *Ibid*, 1947, i, 373.

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be strong support, too, for BOLAND's further recommendation that the head of the medical services, whether at the War Office or in the field, should be granted a higher status, and that control of these services should pass from the Adjutant-General to a separate branch of the General Staff. In pressing for increased opportunities for training and advancement in clinical work, as opposed to administration, he underlined a defect long plain to doctors both in and outside the Services. The clinician's chances of achieving high rank, though greater than formerly, are still too few; and the effect is to impair efficiency. BOLAND finds it significant that on the whole the men who have brought most lustre to the R.A.M.C. are the pathologists and hygienists, for whom the road to promotion is wider than for others. Openings for advancement, however, must be paralleled by opportunities for training,[2] and BOLAND favours the establishment at home and abroad of Service hospitals which would receive both Service and civilian men and women.

Under modern conditions even more important than increased clinical efficiency is preparation of the Regular skeleton to bear the weight of a vast and rapidly growing body in time of war. Besides being strong, this skeleton must be flexible, and the high level of efficiency demanded of its components cannot be achieved without special training which anticipates the strains of war. On mobilisation, almost at a moment's notice the lance-corporal clerk is appointed chief clerk, and the quartermaster-sergeant is commissioned as lieutenant-quartermaster. Everywhere officers and men are assigned duties a step beyond what they would normally consider the limit of their capacity. But war-time expansion does not involve only advancement in a familiar field; for the quartermaster may find himself a registrar administering a hospital, while his Q.M.S. becomes second-in-command of a medical stores. If this transition is to be smooth, and if, as BOLAND hopes, medical man-power is to be saved in war-time by greater employment of non-medical officers, then preparatory experience is essential. In the Army the possibility of war-time expansion is, of course, acknowledged by training officers and others for duty in higher ranks; but the late war showed that senior N.C.O.'s and non-medical officers in the R.A.M.C. had not been versed in the "shadow" posts which they came to occupy with the outbreak of war. Their training, to be effective, calls for boundless prevision, and similar prevision is required for the curtailment of the medical officer's round of clerical work. In war there is no short-term remedy for the shortage of doctors; and in 1939–45 the needs of the civilian population were barely served. BOLAND suggests that with clerical help the Services could have dispensed with at least one in fifteen of their medical officers; and many, with bitter memories of long hours spent with pen in hand, may retort that this estimate is too moderate. However this may be, experience shows that the saving cannot be effected after war has broken out, for then clerks are at a premium. The time to start saving is now, and a possible solution would be recruitment to the Territorial service of more women clerks who could perhaps be tempted by the prospect of free clerical training.

2. *Ibid*, 1945, ii, 531.

Annotations

CALCIFEROL FOR CHILBLAINS

CALCIFEROL (vitamin D_2) is one of a series of products formed when ergosterol is irradiated.[1] Windaus et al.[2] found that the photochemical reactions involved were:

$$\text{Ergosterol} \rightarrow \text{Lumisterol} \rightarrow \text{Tachysterol} \rightarrow \text{Calciferol} \rightarrow \begin{matrix} \text{Suprasterol 1} \\ \text{Toxisterol} \\ \text{Suprasterol 2} \end{matrix}$$

Its administration in large doses has had much attention since Dowling and Prosser Thomas[3] in Britain, and Charpy[4] in France proved that when thus given it usually relieves or cures cutaneous tuberculosis. Once the work on tuberculosis had been accepted, it was inevitable that other uses for the remedy would be sought, and equally inevitable that it would be tried for chilblains.

Reviewing an enormous and unsatisfactory literature, Winner and Cooper-Willis[5] note that many Continental doctors regard chilblains as manifestations of tuberculosis—a view not accepted here. They recall that Almroth Wright[6] described diminished coagulability of the blood in chilblain subjects, thus providing the basis for the popular treatment with calcium, but that Hallam[7] did not confirm Wright's findings and that Percival and Stewart[8] showed that in these subjects the blood-calcium level was consistently normal. There appears, in fact, to be little scientific justification for giving calcium (with or without vitamin D) for the prevention or cure of the lesions. Yet many competent doctors aver that they often do good, and it will require something a good deal more weighty than the obiter dicta of consultants and scientists to convince these men that their clinical findings are erroneous.

Phelan[9] states that Tecoz, Lavril, Pelicier, and others have successfully used calciferol in the treatment of chilblains by giving 15 mg. (600,000 I.U.) in a single dose, and reports that of 14 cases 8 were cured and 3 improved by the oral or hypodermic administration of similar doses of the vitamin. In a paper which we publish this week Dr. Anning reaches the contrary conclusion that calciferol is ineffective. The controversy may perhaps continue until we adopt the American expedient of ensuring an equable temperature in our houses. Adequate central-heating banishes chilblains, and in many parts of Canada and the United States where the weather can be very cold the word "chilblain" has almost vanished from the vocabulary.[10]

In large doses calciferol is a dangerous substance, and its dangers have been repeatedly emphasised.[8 11 12] Like the sulphonamides, it can be used carelessly with success on many occasions, so that the unwise physician begins to feel "what fools these clever men be"; and then there is an unexpected tragedy. Though many people can take large doses for short periods without apparent harm, a few are intolerant from the first, rapidly developing nausea, headache, vomiting, and prostration. Moreover calciferol can cause a quiescent tuberculous focus in the lungs to flare into activity, and its use is contra-indicated in persons with arterial or renal disease. When given for chilblains in doses of, say, 50,000 I.U. daily for two or three weeks, it does not carry much risk, provided the patient is healthy;

1. Goodman, L., Gilman, A. Pharmacological Basis of Therapeutics, New York, 1941.
2. Quoted by Goodman and Gilman (ref. 1).
3. Dowling, G. B., Thomas, E. W. P. *Lancet*, 1946, i, 919.
4. Charpy, M. J. *Ibid*, p. 400.
5. Winner, A. L., Cooper-Willis, E. S. *Ibid*, 1946, ii, 663.
6. Wright, A. E. *Ibid*, 1897, i, 303.
7. Hallam, R. *Med. Pr.* 1930, 180, 408.
8. Percival, G. H., Stewart, C. P. *Brit. J. Derm.* 1924, 39, 144.
9. Phelan, J. J. *Lancet*, 1947, i, 160.
10. Johnson, R. E. *Ibid*, p. 160.
11. Dowling, G. B. *Ibid*, 1946, i, 590.
12. Bicknell, F. *Ibid*, p. 717.

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but it is probable that no-one who is not suffering from vitamin-D deficiency can take large amounts for several weeks without suffering some degree of temporary or permanent renal damage. Hence it is inadvisable to give a patient a prescription for calciferol and allow him to use it at his own discretion. If he gives himself several courses of treatment during a succession of winters he may require advice for symptoms far more serious than those of chilblains.

A SOCIAL RESEARCH COUNCIL?

LAST Saturday the Association of Scientific Workers met in London to consider a memorandum on the furtherance of the social sciences. Just over a year ago the Clapham Committee, which had been asked "whether additional provision is necessary for research into social and economic questions," recommended [1] the establishment of (1) a standing interdepartmental Economic and Social Research Committee, and (2) a subcommittee of the University Grants Committee to advise and foster the social sciences within the universities. The association agrees with both suggestions, but also favours the proposal made two or three years ago for the formation of an official Social Research Council, comparable with the Medical Research Council and others concerned with the physical and biological sciences. The Clapham Committee turned this proposal down: (1) because the chief needs of the social sciences are the strengthening of staffs and provision for routine research; (2) because at the present stage of the social sciences an official body might promote crystallisation of spurious orthodoxies; and (3) because the best men must not be diverted from active research to the coördination of research. The association does not dispute that staffs are insufficient, but it holds that in the scramble for trained personnel no unofficial body could adjudicate between the claims of Government and other research establishments. It rebuts the Clapham Committee's contention that existing research councils have never assisted, and are not suited to assist, research carried out as a normal routine function. Many sciences, it says, have fallen into spurious orthodoxies, irrespective of control by official bodies, and the key to safety lies in untrammelled discussion among workers. The danger that the best men may be diverted to duties of coördination is overshadowed, in the association's view, by the need to prevent overlap and to fill the most important gaps.

The association thinks that the Clapham Committee greatly underestimated the importance of increasing social research; and it wants to see teams formed to examine the factual background of social problems and to collaborate with the people who have to carry out social policies.

DICOUMAROL IN CORONARY THROMBOSIS

INCREASING evidence of the value of anticoagulant therapy in the treatment of coronary thrombosis is forthcoming from America. A recent report from the Mayo Clinic is based on a series of 50 cases of acute myocardial infarction admitted to hospital within a few days of onset.[2] In 40 cases dicoumarol was used alone, while in the remainder heparin was also given. The plan of dosage was that recommended by Barker et al.,[3] wherein the aim is to keep the prothrombin level between 10% and 30% of normal. This was achieved by giving 300 mg. of dicoumarol on the first day, and 200 mg. on the second. On each succeeding day that the prothrombin level was greater than 20% of normal 200 mg. was given in a single dose. If the prothrombin level was less than 20% of normal, no dicoumarol was given on that particular day. While an immediate anticoagulant effect is obtained with heparin, there is a lag of 36–48 hours with dicoumarol. The only complications encountered were 1 case of spontaneous hæmorrhage into the knee-joint, which cleared completely, and 1 mild epistaxis; and microscopic hæmaturia was noted in 1 case. The importance of daily estimations of the prothrombin-time is indicated by the finding that in 12 cases the prothrombin level fell to less than 10%, and in 6 of these the intravenous administration of menadione bisulphite was necessary, while in 6 cases the level rose to above 30% for a few days and during this time a second myocardial infarct occurred in one of the patients.

In assessing the results of treatment a series from the same clinic reported by Nay and Barnes [4] was used as a control: of 100 consecutive cases of acute myocardial infarction, in which anticoagulant therapy was not attempted, thrombo-embolic complications ensued in 37%. In contrast to this, in Parker and Barker's 50 cases, treated with anticoagulants, there were only 2 instances of secondary thrombo-embolic complications. Even more interesting is the observation that in the 2 cases that came to necropsy neither pulmonary emboli nor mural cardiac thrombi were present, whereas pulmonary emboli were found in 5, and mural thrombi in 7, of the 11 cases which came to necropsy in the control series. The mortality-rate was not appreciably different in the two series: 10% in the patients receiving anticoagulant therapy and 13% in the control series. The Mayo Clinic report supports the impression from earlier accounts that dicoumarol is useful in the treatment of myocardial infarction.

THE NATIONAL HEARING-AID

IN response to a request by the Ministry of Health, the Medical Research Council appointed, at the beginning of 1944, a committee on electro-acoustics [5] to design a single type of electrically operated hearing-aid, and to determine specifications for pure-tone audiometers. The committee's design for an aid has already been approved by the Ministry of Health; and under the National Health Service this is to be issued free of charge to those found, after examination at special centres, to be in need of it.

In a report published this week,[6] the committee describe the investigations which preceded their choice of prototypes. Intelligibility for speech was regarded as the real measure of success; and theoretical consideration indicated that maximum speech intelligibility need not necessarily result from matching the amplification provided by the aid to the hearing loss of the user. This view was confirmed by practical work at Manchester University and at the National Hospital, Queen Square, London; and it was concluded that, while effective amplification must be provided for all sounds within the $3^1/_2$-octave range needed for good reproduction of speech, this amplification should increase smoothly with increasing pitch over the lower part of the range, and then either continue to increase at a slower rate or remain constant for the middle and higher-pitched sounds. Piezo-electric microphones were considered to be the

1. Report of the Committee on the Provision for Social and Economic Research. (Chairman: the late Sir John Clapham.) Cmd. 6868. H.M. Stationery Office. 1946.
2. Parker, R. L., Barker, N. W. *Proc. Mayo Clin.* 1947, **22**, 185.
3. Barker, N. W., Cromer, H. E., Hurn, M., Waugh, J. M. *Surgery*, 1945, **17**, 207.
4. Nay, R. M., Barnes, A. R. *Amer. Heart J.* 1945, **30**, 65.
5. The members are: W. G. RADLEY, C.B.E., B.SC., PH.D., M.I.E.E., controller of research, Engineering Department, General Post Office (chairman); Sir LAWRENCE BRAGG, O.B.E., M.C., M.A., D.SC., F.R.S., Cavendish professor of experimental physics, University of Cambridge; R. S. DADSON, M.A., National Physical Laboratory; C. S. HALLPIKE, M.B., F.R.C.P., F.R.C.S., Medical Research Council; Colonel D. MCMILLAN, O.B.E., B.SC., A.M.I.E.E., Post Office Engineering Research Station; L. C. POCOCK, M.SC., A.M.I.E.E., Standard Telephones & Cables Ltd.; and T. S. LITTLER, M.SC., PH.D., University of Manchester (secretary).
6. Hearing Aids and Audiometers. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 261. H.M. Stationery Office. 1947. Pp. 71. 1*s.* 3*d.*

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most suitable; and a crystal microphone with a metal diaphragm was recommended as being stable under varying atmospheric conditions and as giving the required performance. Small crystal insert receivers are given a word of special commendation, but the committee's aid is designed for both this type and the earcap type. The receiver with a flat earcap advocated in the report is a modification of a miniature unit developed originally for the Fighting Forces; it weighs about an ounce. The battery replacement cost, according to the report, is about 1·1*d.* per hour of actual use with the external receiver type of aid; while with the insert receiver aid the running cost is about 0·6*d.* per hour.

FUMIGATION WITH METHYL BROMIDE

METHYL bromide is mainly used as a refrigerant, as a fire-extinguisher, and as a methylating agent. Recently it has become popular as a fumigant of ships, warehouses, and other premises to control insect pests, and in this connexion fatalities and poisonings have been reported. The chemical being highly toxic to human beings as well as to insects, the Home Office has issued a useful pamphlet[1] on the risks and precautionary measures.

Methyl bromide boils at a low temperature (4·5°C) and it is therefore usually distributed under slight pressure in cylinders containing the liquid, contact with which may cause severe blistering. Clothing contaminated with the liquid should instantly be removed because a high concentration of gas can arise from it. The gas is heavier than air and has greater powers of penetration through walls and sealing material than other common fumigants such as hydrogen cyanide or ethylene oxide. Deaths have resulted both from exposure to high concentrations of the gas and also from continued exposure to low concentrations. The gas is insidious because it has only a faint odour and also because the symptoms after exposure may be delayed for a day or more. The symptoms of poisoning are mainly referable to the nervous system and include headache, dizziness, diplopia, vomiting, and lethargy, with later convulsions and collapse.

The precautions taken should be at least as rigid as those taken when HCN is used, and it is recommended that a pungent lacrimatory gas such as chloropicrin (5%) should be added to methyl bromide so that its presence in the air can easily be detected.

In addition, all apparatus used for the delivery of methyl bromide gas into rooms should be tested before being used in practical operations. The halide detector lamp is recommended for detecting low concentrations of methyl bromide in the atmosphere. These lamps vary in sensitivity to the gas, some types probably not being sensitive enough to detect 17 parts per million of methyl bromide, the figure given as the upper limit of safe concentration. Advice on suitable types can be obtained from the director of the Pest Infestation Laboratory at Slough. It is desirable that the people carrying out fumigation operations should be given practical demonstrations of the performance of the lamps in known concentrations of methyl bromide. The lamps should be used to detect leaks at the time of fumigation, during the exposure period, and before a clearance certificate is issued.

Each operator or other person entering the space under fumigation must be provided with a protective apparatus of proved efficiency against methyl bromide. In high concentrations of the gas a self-contained (oxygen-generating) or a positive-pressure air-breathing apparatus is necessary, but in low concentrations canister respirators of an appropriate type may be used.

Before fumigation, rooms and other spaces should be sealed with an impervious material which should be of an even higher standard than for fumigations by HCN or ethylene oxide. All rooms, compartments, and alleyways with walls common to those of the area to be fumigated should be evacuated, and warning notices should be affixed. Fumigation staffs should consist of at least two persons, and one of them at least should be in attendance throughout the fumigation and airing period. Both persons should have adequate colour-vision and should be trained in the use of protective and detector apparatus and in first-aid. The dose of methyl bromide should be injected from cylinders placed outside the fumigation area. Airing should be conducted and concluded before the entry of any person other than the operators, who should work in pairs and wear their respirators until tests show that the concentration of gas is a safe one. At this stage a preliminary certificate of clearance is to be issued and the fumigated area closed again for a period to guard against the risk of dangerous quantities of gas being subsequently evolved from absorbent material. A final certificate of clearance should not be given until thorough tests have been made. Ships should never be fumigated until all persons have been taken off, and special care should be taken to test the air in the holds before a clearance certificate is issued.

1. Fumigation with Methyl Bromide. H.M. Stationery Office. June, 1947. Pp. 8. 2*d.*

TELEVISION IN SURGICAL OPERATIONS

LAST February surgical operations were televised for the first time at the Johns Hopkins Hospital, Baltimore.[1] One camera was fixed 4½ ft. above the operating-table, and the image was so sharp that the numbers on a dollar bill placed on the table could be clearly read on the projection screens. A second camera was installed in the gallery to give a general view of the theatre; and the surgeon provided a running commentary through a microphone. The experiment is said to have proved conclusively that demonstration of operations to a group of more than three or four is best effected by television, even though, for the moment, reproduction is only in black-and-white.

BRITAIN'S HEALTH

THE results of the medical examination of men and women called to the colours in 1939–46 are summarised in a report from the Ministry of Labour and National Service.[2] It will be remembered that grades I and II were deemed fit for military service, while grades III and IV were not. Grade IIa consisted of those who, though fit for service, were handicapped by defects of visual acuity or by deformity of the feet. Of the 3,240,906 youths under 21, 91% fell into grades I and II, and 9% into grades III and IV; and of the age-group 21–25 (1,085,908 men) 85% were fit and 15% unfit. At ages 26–35 (2,045,480 men) the percentages were 79 and 21, and at 36–45 (805,480 men) they were 65 and 35. One should be careful in using these figures as a basis for conclusions about the health of the country as a whole, for the scale is heavily weighted at the younger end, where one would expect to find the majority in good health. It is perhaps encouraging, however, that of the relatively few men over the age of 36 the proportion adjudged fit for service was as high as 65%.

Women examined numbered 550,486—less than a tenth of the total of men. They were volunteers in the sense that they preferred joining the Forces to entering industry, and as might therefore be expected they had a rather better health bill than the men, though the difference in the proportions accepted and those refused was not great. Among the men eye trouble and foot trouble were about equally prevalent, but in the women deformities of the feet were noted nearly five times as often as defects in visual acuity.

1. Trimble, I. R., Reese, F. M. *Bull. Johns Hopk. Hosp.* 1947, 81, 186.
2. Report of the Ministry for 1939–46. Cmd. 7225. H.M. Stationery Office. Pp. 394. 7*s.*

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THAT COLD VIRUS AGAIN

THE common-cold virus, against which hostilities were for some years suspended, is now the object of a determined search by several groups of laboratory workers in different countries. At Harvard Hospital, Salisbury, the scientific staff of the Medical Research Council is making investigations with the aid of human volunteers.[1] Another group of workers, this time in the University of Texas, has recently recorded observations likewise based on that susceptible animal—the human volunteer. Pollard and Caplovitz [2] inoculated nasal washings from several cases of common cold into the chorio-allantoic cavity of 7-day-old developing chick embryos and passaged the allantoic fluids at 4-day intervals in further embryos by the same route. Bacterial growth was checked by addition of penicillin to the garglings, and the allantoic fluids were tested periodically by intranasal inoculation into human volunteers. The first "strain" gave negative results with materials from the 2nd passage, the second was infectious for 2 passages but gave mild or negative reactions with 3rd or later passages, and the third "strain" (Spill) induced coryza-like symptoms after 9, 11, and 12 consecutive chick passages. The authors noted that the later passages of this strain induced milder symptoms than the earlier ones: indeed the reactions recorded with 11th and 12th passage material seemed to have scarcely any resemblance to the common cold, though five of the six individuals inoculated with material of the 9th passage might claim that their symptoms of stuffy nose, sneezing, and nasal discharge were equivalent to the natural disease. This part of the report seems convincing enough, though the absence of control volunteers makes the significance of the conclusions uncertain. We are next told, however, that six volunteers were inoculated intranasally with allantoic fluid of the Spill strain in its 9th chick passage, and that five developed colds. These five, together with five new volunteers, were inoculated subcutaneously, at weekly intervals, with two doses of infectious allantoic fluid of the same strain; and one week after the second inoculation they and two control uninoculated subjects received an "immunity test" by the intranasal inoculation of a Seitz-filtered pool of nasal washings from naturally acquired cases of common cold. Only the two "controls" developed symptoms.

Pollard and Caplovitz rightly refrain from commenting on their observations or from making any deductions; for an experiment as important as this might be must certainly be supported by better evidence before it can be accepted at its face value. No virus worker would place much reliance on an observation based on results in ten immunised animals compared with those in two controls. Moreover, the material used for the immunity test was a Seitz filtrate, though the previous cultivation work was based on unfiltered garglings. Finally, of the two control subjects, only one had symptoms severe enough to be classed as a cold for more than twenty-four hours. Much as one would like to welcome these experiments as promising better times in the prevention of the common cold, it cannot be said that they do more than indicate a repetition with more stringent controls. Perhaps it would be as well to add: "Over to you, Salisbury!"

1. See *Lancet*, 1946, i, 680.
2. Pollard, M., Caplovitz, C. D. *Science*, 1947, **106**, 243.

MEETING THE MINISTER

ON Dec. 2 and 3 the Negotiating Committee will meet the Minister of Health and hear his response to the argued case they have placed before him. The profession has not yet been informed of the arguments advanced on its behalf, though Dr. Dain has reiterated his opinion that an amending Act is necessary. In difficult circumstances we trust that both sides will nevertheless aim at a reconciliation of views, enabling doctors to enter the service with a degree of good will which has not yet been encouraged to develop.

To

SIR CHARLES SHERRINGTON, O.M.

On his 90th birthday, November 27, 1947

Man shapes the patterns of his mind
As models of the world without,
But to himself he long was blind
And found no answer to his doubt.

You first within the brain discerned
The meaning of its ordered ways,
And man of his own nature learned
To thread the labyrinthine maze.

Poet, you saw the vibrant nerves
Subdued to metrical control,
By which each one in rhythm serves
The guiding purpose of the whole.

These lines a homelier homage bring
Than all the laurels time has brought—
A wish as birthday offering
From world-wide children of your thought.

May age, which clouds the body's eye,
Still leave undimmed the inward sight
That reads life's secret poetry
With timeless wonder and delight!

W. RUSSELL BRAIN

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Special Articles

GERIATRIC REHABILITATION *

L. Z. COSIN
F.R.C.S.
MEDICAL SUPERINTENDENT, ORSETT LODGE HOSPITAL, ESSEX COUNTY COUNCIL

NURSES to attend the aged sick are very scarce, and likely to remain so. It therefore behoves us to diminish the number of aged patients needing much nursing care. This can be achieved by geriatric rehabilitation.

For many patients over sixty years of age progressive deterioration is inevitable, but others may be expected to improve—rapidly or slowly. With an active approach to the problem more and more can receive treatment in bed preparatory to the restoration of assisted or unassisted ambulation. By including this method of treatment at Orsett Lodge Hospital during a recent two-year period, we found that of 780 patients over the age of sixty 45% were rehabilitated, while 35% died and only 10% remained bedfast after six months. (Transfers and more recent admissions account for the remainder.)

AIMS AND METHODS

During the late war we saw how the group encouragement provided in rehabilitation units of the Armed Forces and industry accelerated individual recovery. In these units there were facilities for occupational therapy, physiotherapy, and remedial exercises, with a cheerful and happy environment. This solution suggests that every patient of whatever age and disease needs a hopeful environment for his well-being or recovery; without it convalescence is delayed or deferred indefinitely.

The chief factor in geriatric rehabilitation is the visible improvement of other patients similarly incapacitated, while efficient medical and surgical care are very important subsidiaries. The rehabilitation of our aged patients must begin on admission to hospital, so that the physical and mental deterioration induced by long-continued recumbency does not take place. Tacit acceptance of a poor prognosis—not always accurate—has been responsible for many avoidable deaths from pulmonary embolism in the bedfast.

The aim of geriatric rehabilitation is to restore the maximum degree of painless movement by means of active physiotherapy and remedial exercises, resulting in the maximum of personal independence; we can no longer be satisfied with merely removing pain. If the patient reaches a stage of weight-bearing, assisted or unassisted, so much the better. Utilising simple physiotherapy for a sufficiently long period the proportion of patients who are bedfast can be dramatically reduced. No longer do we label our patients irremediable, incurable, chronic, or senile; instead we make a prognosis based both on diagnosis and on an assessment of the particular person's physical capacities. We recognise that deterioration inevitably accompanies certain irremediable diseases, and that a time must come when the patient will have to remain in bed throughout the 24 hours; but it is surprising how long this point can be postponed. Many patients with advanced malignant disease are happier and complain less of pain when encouraged to get out of bed for a part of each day to help themselves. With few exceptions, in which I include the final inevitable deterioration, the inability of a permanently bedfast patient to feed and generally look after himself is to be regarded as a medical reproach.

FOUR CATEGORIES

Using this method we can recognise that most aged patients fall into certain broad categories.

1. Those patients who cannot provide their own feeding and residential arrangements but are otherwise fully competent to attend to their own needs. They feed themselves, dress themselves, and help about the ward. They require no night attention, are continent, and are capable of completing light occupational tasks.

2. The frail ambulant who is in need of increased periods of rest but can usually cope for himself. (I am adopting the provocative attitude of including among these a large proportion of cases of senile dementia and cerebral arteriosclerosis; for the criterion of bedfastness should be a sufficient physical disability—a condition not obvious in most of these patients.)

These two categories need minimal nursing supervision and extra physical help, for which ward orderlies can be employed. Many of those in the first group should not be in an institution at all if they could be provided with suitable homes.

3. The physically disabled bedfast patient who feeds himself, generally looks after himself, and may be continent. This class of patient does not make a very heavy call upon our nursing service, and we should aim at reabling our bedfast patients into this group.

4. The physically disabled permanently bedfast patient who needs every nursing care and attention. In my opinion the number in this category, swollen by previous medical neglect, should and could be much reduced.

A good medical, surgical, and nursing service alone will not reduce the proportion of bedfast patients to a minimum unless it embodies the principle of geriatric rehabilitation. In these days of rapid social change the revolt against recumbency must be made successful.

* Read before the International Conference of Physicians in London, September, 1947.

DYNAMICS OF THE CEREBROSPINAL FLUID

IN a Honyman Gillespie lecture in Edinburgh on Nov. 13, Dr. E. A. CARMICHAEL (London) said that the original conception of Munro and Kelly of the craniovertebral system as a closed and rigid container had had to be modified in the light of the observed fluctuations in pressure of the cerebrospinal fluid (C.S.F.). Dr. Carmichael and his associates had thought it necessary to examine the parts played by the various elastic or possibly elastic structures—the arteries, veins, and capillaries, and the meninges—in allowing fluctuations in pressure.

Manometric observations were made, mainly on subjects in the erect posture. In most the pressure in the lumbar sac was equal to the distance between the needle and the cisterna magna. Jugular compression did not affect the increase in the lumbar pressure on change from recumbent to erect posture. Thus distension of cranial veins is not itself the factor producing the lumbar pressure in the erect position. Abdominal compression increases the lumbar fluid-pressure in the recumbent subject, but if the subject is raised to the erect posture abdominal compression does not cause further increase. The lumbar fluid-pressure appears to reflect the pressure in the lumbar veins. In a patient with a spinal tumour in the lower cervical region which caused complete subarachnoid block, abdominal compression with the subject in the recumbent posture raised the pressure in the lumbar sac to the level of the cistern—i.e., above the level of the block—and the same change was found in the erect posture. In other words the patient reacted in the same way as the normal subject. The hypothesis that the rise in lumbar pressure in the erect posture is associated with dural collapse in the cervical region and distension in the lumbar region was thus refuted; the rise is rather to be attributed to change in pressure in the lumbar veins.

A series of studies was made of the spontaneous fluctuations in intracranial pressure in patients with craniotomy openings. Pressure fluctuations take place with respiration; little change is recorded during inspiration, but towards the end of expiration intracranial pressure first rises and then falls. With the subject in

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the recumbent posture jugular and arm venous pressures fall during deep inspiration, but in the erect posture the jugular venous pressure does not vary even with deep respiration, and it is evident that variations in intrathoracic pressure during respiration in the erect subject are not transmitted back to the intracranial veins and are not the cause of the fluctuations in intracranial pressure.

In the erect posture both intraventricular pressure and cisternal pressure show a rise during deep inspiration, followed by a pronounced and prolonged fall with expiration. It can be shown that, when a spinal tumour wholly blocks communication between the cistern and the lumbar sac, the respiratory fluctuations in the pressures in these two parts are in opposite directions and must be due to different mechanisms. The changes in the lumbar sac appeared to be in response to pressure changes in the abdominal and lumbar veins, but the pressure changes in the cistern could not be related to changes in intracranial venous pressure. During deep inspiration the systolic arterial pressure rises, and it then falls during expiration. Similarly and at the same time, the cisternal pressure rises and falls. If the subject is agitated by the posing of a difficult arithmetical problem the systolic blood-pressure and the cisternal pressure rise. It was shown that these changes are not due to vasoconstriction or vasodilatation of the cerebral vessels. Furthermore, changes in blood oxygen and carbon-dioxide content, although altering C.S.F. pressure, do not do so rapidly enough to be involved in the fluctuations associated with respiration.

Dr. Carmichael concluded that with the subject in the erect position the fluctuations in the cisternal fluid pressure are due to fluctuations in arterial blood-pressure; but fluctuations in pressure in the lumbar sac are due to changes in venous pressure as influenced by respiration. He contended that the dura is not an elastic structure and that the rise in lumbar pressure with the assumption of the erect posture is not due to cervical dural collapse and lumbar dural distension.

GENERAL MEDICAL COUNCIL

PRESIDENT'S ADDRESS

THE 172nd session opened last Tuesday with an address from the president, Sir HERBERT EASON. He spoke with regret of the death of three former members of the council: Dr. Cecil Wall, Sir Norman Bennett, and Mr. J. A. Woods. The King's Birthday Honours list in June included the names of Prof. J. A. Gunn and Dr. Wilfred Fish, who were appointed C.B.E. Professor Gunn, as an original member since 1928, and chairman since 1939, of the British Pharmacopœia Commission, has long been associated with the council. Dr. Fish has been a member since 1942. The president also congratulated Mr. J. J. Robertson, M.P., a Crown nominee to the council, on his appointment as joint parliamentary under-secretary to the Secretary of State for Scotland. He introduced Mr. C. P. Harvey as legal assessor at the new session.

The President has received from the Home Office a letter calling attention to the number of thefts of dangerous drugs and other poisons from cars left unattended by doctors. The Home Office has pointed out that time would be saved and the public safety increased if all doctors would remove poisons from their cars when unattended, or alternatively would lock their cars.

The President regretted that owing to pressure of other business there is no certain prospect of a draft Bill amending the Medical Acts being considered during the present Parliamentary session. "The short draft Bill submitted by the Council to the Government included not only important provisions based on the recommendations of the Goodenough Committee, but also provisions giving practitioners a right of appeal to the Courts against penal erasure from the Medical Register; giving the Council statutory power, which they do not at present possess, to restore the names of practitioners to the Register after penal erasure; enabling the Council to take evidence on oath and to compel the attendances of witnesses by subpœna; and enlarging the direct representation of the profession on the Council. The enactment of such provisions as these would, I believe, commend itself alike to the profession and to the public."

The council then proceeded to the consideration of other business.

LONDON'S VOLUNTARY HOSPITALS

THE practical interest of the public in the voluntary hospitals of London is again well demonstrated in the Annual Statistical Summary for 1946 just published by King Edward's Hospital Fund for London. The total maintenance income (including all free legacies) of the 161 hospitals reached a record figure of £7,360,000. In addition, £195,000 was given for endowment, and £287,000 for building and equipment, making a grand total of £7,842,000—£363,000 more than in 1945 and £2,117,000 more than in 1938, the last complete pre-war year. Income from subscriptions and donations rose by £91,000 to £1,364,000 (1938, £1,091,000); patients' contributions by £224,000 to £1,343,000 (1938, £1,021,000); and contributory schemes by £49,000 to £961,000 (1938, £689,000). Legacies produced £551,000, compared with £676,000 in 1945 and £595,000 in 1938.

Ordinary income amounted to £6,809,000, which was obtained from the following sources: public authorities (25·7%); subscriptions and donations (20%); contributory schemes (14·1%); investment property (10·9%); ordinary patients (9·9%); pay patients (9·8%); central funds (5·2%); fees, &c. (4·4%). Maintenance expenditure amounted to £8,666,000—£2,193,000 more than in 1945 and £3,717,000 more than in 1938—leaving a deficit (after the inclusion of free legacies) of £1,306,000. In 1945 there was a surplus of £410,000, and in 1938 a deficit of £140,000.

A considerable increase over the previous year in the volume of work is recorded. The number of new inpatients rose from 237,000 in 1945 to 266,000 in 1946 (1938, 308,000), and the average number of beds occupied daily from 12,881 to 13,713 (1938, 16,211). New outpatients totalled 1,858,000, compared with 1,635,000 in 1945 and 2,042,000 in 1938, and outpatient attendances 8,925,000, compared with 7,872,000 in 1945 and 10,343,000 in 1938. The summary reflects the enormous increase in the cost of hospital service. In 1938 the average cost of a bed was £233 per annum: in 1946 it was £490, an increase of 110·3%. The average cost per 1000 outpatient attendances in 1938 was £110: in 1946 it was £209, an increase of 90%.

SHORT FORM OF BIRTH CERTIFICATE

A NEW and short form of birth certificate, showing only name and surname, sex, date of birth, and (where possible) place of birth, will be obtainable at a cost of 6d. from Monday, Dec. 15. In the case of births registered in England and Wales application may be made to the superintendent registrar of the district in which the birth took place, or to the General Register Office, Somerset House, London, W.C.2. A short certificate may also be obtained from the local registrar at the time of registration of the birth. Where births have been registered abroad and entered in Army, Air Force, Consular, or Marine records deposited with the Registrar-General, certificates may be had only from the General Register Office; and this applies also to certificates relating to adopted children.

The effect of the new certificate is to remove the disability imposed on those of illegitimate birth, who have hitherto had to submit the full certificate, with details of parentage, when required to establish the date of their birth.

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In England Now

A Running Commentary by Peripatetic Correspondents

NOTHING could have been less peripatetic than your correspondent between 6.30 A.M. and 12.30 P.M. on Thursday last week as he stood immobile with his solar plexus pressed against an iron rail and his other sides compressed by a solid mass of humanity.

I had come, more or less straight, from a decidedly wet celebration at "the local" of my ship's defeat at both soccer and darts by a sister ship, and had arrived at about 12.30 A.M., when things were still quite lively in the Strand and Square. One could sustain life at the coffee-stalls or on chestnuts, tomatoes, grapes, or even ice-cream. Already the kerbs were strewn with forms in every conceivable attitude of uncomfortable sleep. An enterprising merchant was selling bits of sacking at a bob to keep the chill off. I relied on newspaper as an antihæmorrhoidal and antirheumatic, and between rather frequent visits to the station dozed fitfully with my back against a stanchion.

Between 2 A.M. and 5 things were comparatively quiet, but long before dawn there was a mysterious, incessant twittering, and, as the sky paled, flocks of innumerable starlings swept across the Square, from which the pigeons were entirely ousted by the gradually increasing crowds.

At about 6 I took up my stance on the rails. In my immediate neighbourhood were a most voluble Irishwoman, who persistently cajoled the police with sweets, two ladies in heavy furs, another suffering from a thick leather jacket and pediculosis capitis fulminans, and several children with impetigo very contagiosum.

With the ever-increasing pressure came the faintings, fast and furious. Of the two methods of extrication the Compression Method seemed better on the whole than the Elevation. In the former the patient was forcibly squeezed through the seemingly incompressible mass, and, after being bent double under the rails, emerged flushed and breathless. In the latter they were somehow hoisted above the heads of the crowd and rolled by hand to the St. John's men at the perimeter. I imagine their chief concern was the loss of valuables.

In my vicinity at any rate the B.R.C. was conspicuous by its absence, but St. John had never a dull moment and had even to rope in Scouts as stretcher-bearers.

Maybe this pandemic of syncope was partly due to faulty nutrition. Could it possibly have been aggravated by the surprisingly lugubrious music of the Royal Marine band, whose only inspiration was "O, what a beautiful morning!"? Occasionally one had the impression that the diagnosis might have been feigning rather than fainting, so rapid was recovery when a better view seemed probable. Other opportunists were certainly not slow to take advantage of any disturbance of the mass.

But on the whole the temperament was of a warm-hearted, give-and-take character. I saw a tallish man try really hard to comply with the persistent entreaties from the rear to make himself smaller. I, even I, compressed myself to such an extent as almost to suffer the lamentable fate of Judas I.

As to the pageant itself, in the oft-reiterated phrase of some girls behind me, "It was luv-ly—ain't she luv-ly." And was it worth the effort? Yes, a thousand times yes. But what psychological motivation prompted one to the experience or was satisfied thereby 'twould not be easy to say.

* * *

I have just had my first experience of general practice, and the humour and friendliness of my Welsh patients struck me very much. I found there were two predominant reactions to my arrival: the curious majority said, "Let's go and see what he's like; maybe *he'll* cure us," whereas the cautious minority said, "Let's wait till our own doctor comes back." The strongest supporter of class II was the wifey who asked for Dr. X at the surgery and on being told about me announced with feeling, "I'm not seeing *him*"; and neither she did. I was surprised at the range of cases one sees in a short time—medical, surgical, eyes, ears, noses, throats, fevers, sick kids, and the biggest group of all, those up for "sustifickits."

The people appeared to appreciate being chatted with, about this, that, and the others, and if a G.P. had sufficient time I'm sure he would get much interest out of his patients. There was the lad who, on being asked about his work, replied, "I don't work, I'm a student." And the old lady, almost totally bedridden for eleven years, who got some excitement whenever Dr. X's holiday came round by thinking to herself "I wonder what this year's locum will be like." I felt sorry for the man who had waited patiently for an hour in the crowded surgery when his wife phoned: "Is my husband there? Send him home immediately, and tell him to bring the cat with him." So off he went, with the cat still tucked inside his jacket. I don't know whether I was to have seen him or the cat. And lastly the doctor's small son. He was very worried about how I was to go on my rounds, for I had no car of my own. He asked the dispenser, tearfully, with his slight lisp: "The new doctor ithn't going to uthe my new thcooter, ith he?"

* * *

For many years I have done what little I could to curb the use of abbreviations by my students. But I had no idea how far this pernicious habit had spread until I encountered Cecily C. Matthews's new *Dictionary of Abbreviations*.

I am still awaiting the reactions of my friends among the officials of the Royal Society of Medicine (not to be confused with Regimental Sergeant-Major, Royal School of Mines, or Royal Scottish Museum) to the entry "F.R.S.M. Fellow of the Royal Society of Medicine." Fellows of the Royal Society will be interested to learn that their distinguished initials are claimed by "Federal Reserve System (U.S.A.); Friends' Relief Service; Fuel Research Station," but they may be somewhat disconcerted by the entry "F.R.S. (L.) Fellow of the Royal Society (London)." Their distinguished president shares honours with "Performing Right Society; Proportional Representation Society; Protestant Reformation Society." I had always recognised that my M.D. was a stock abbreviation in the psychiatric world, but I had never appreciated its many other uses: "Managing Director; Market Day; 'Medicine and Duty'; Memorandum of Deposit; Mess Deck; Message-Dropping (R.A.F.); Metropolitan District (rly.); Metrology Department; Middle Dutch; Military District; Mine Depot (nav.); Monroe Doctrine"! The B.M.'s among us score heavily compared with the mere M.B.'s: "*balneum marinum* (sea-water bath—med.); Beach Master (R.A.F.); *Beata Maria* (Blessed Mary); *Beatæ Memoriæ* (of blessed memory—Lat.); bench mark; bending moment; Bishop and Martyr; breech mechanism; Brigade Major; British Museum; Bronze Medallist; Brotherhood Movement; Burgomaster." Our friends in Tavistock Square are paired off with the Bobbin Makers' Association and British Marine Aircraft.

I had never realised what a wonderful collection of letters our dental colleagues could possess, and I give them full marks for modestly abbreviating their L.D.S. R.C.S. Eng. to a mere L.D.S. For length combined with variety, however, they must be prepared to give way to some of the trade-unions. What, for instance, could be better than Z.C.R.G.S.M.W.S.? which I leave you to interpret for yourself.

* * *

These new-fangled terminologies are very confusing to old fogies like ourselves. The other day I asked the resident anæsthetist what he had given the patient. "Seven point five millilitres of soluble thiopentone" was the astounding answer. I suppose he saw I was startled, for he asked me if I didn't approve of the International System of Weights and Measures. "If you mean the metric system, why not say so?" I retorted peevishly. He was horrified—"But, sir, the metre is a hopeless standard of length, it is supposed to be a certain fraction of the circumference of the earth as calculated. . . ." "Oh, all right," I said wearily, "let it go."

It rather looks as if our light literature will read like this in future.

That night matters came to a head at the inn. Tom, who had drunk not wisely but too well, spied Dave as he sauntered up to the bar. Heaving his 15 stone (95·45 kg.) off his stool, he flung a pint (568 ml.) of liquor into his face with every ounce (28·4 g.) of his strength. Spluttering with rage and beer, Dave grabbed his heavy riding whip and roared: "You scoundrel, I'll thrash you within an inch (2·54 cm.) of your life."

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Letters to the Editor

PENICILLIN IN CASES OF CLOSED ORAL SEPSIS

SIR,—In the past, many teeth have been sacrificed on the altar of systemic disease. Though of recent years more balanced judgments have prevailed, I feel that, with the use of penicillin, the pendulum is tending to swing too far in the opposite direction.

Penicillin does not influence the growth of organisms in areas which have little or no blood-supply. The cases recorded below show that penicillin-sensitive organisms can thrive in a dead tooth pulp, or even in an apical dental granuloma, while a patient is undergoing treatment with massive doses of systemic penicillin. The importance of this in diseases such as bacterial endocarditis and metastatic osteomyelitis cannot be too strongly emphasised. It seems in many such cases that relapse after penicillin therapy is due to "a bacterial leak" from an infected tooth, or possibly tonsil, after the penicillin has been discontinued.

CASE 1.—*Osteomyelitis of rib.* Blood-culture gave *Staph. aureus.* Penicillin 2,700,000 units was given in twenty-seven days. Then two infected incisor teeth were removed. Cultures from the pulp of one of these teeth yielded a fully penicillin-sensitive *Staph. aureus.*

CASE 2.—*Septic arthritis of both sacro-iliac joints, with multiple sinus formation.* Three years' history. Cultures yielded a staphylococcus and a hæmolytic streptococcus. The patient was given penicillin 48,000,000 units, in three courses over a period of twelve months. A dead upper molar was extracted during the last week of the third course. Organisms cultured from the pulp yielded a staphylococcus and a *Strep. viridans*, both of them penicillin-sensitive. A week later the sinuses were dry. Six months later they are still dry and the patient is back at work.

CASE 3.—*Bacterial endocarditis.* Penicillin 25,000,000 units was given in twenty-five days. Then an upper premolar was extracted. Cultures from the centre of an apical granuloma yielded a scanty growth of *Strep. viridans*, fully penicillin-sensitive.

The penicillin was continued for a further seven days, and the patient was discharged from hospital shortly afterwards. Four months later she is awaiting admission to hospital for further dental extractions, for cosmetic reasons, under a penicillin "umbrella."

CASE 4.—*Dental abscess*, which had been treated with penicillin 100,000 units a day for three days. When I first saw the patient on extraction, cultures of the pus were sterile, but those from the tooth pulp yielded *Strep. viridans* and a few *Staph. albus* and diphtheroids, all fully penicillin-sensitive. The diphtheroids were probably contaminants.

Numbers of "sterile" reports were received on cultures from teeth roots in similar cases. Not a few of these were probably due to excessive zeal in the flaming of the outer surface of granulomata before dividing them for culturing from their centre. The proportion of sterile findings and positive ones was about equally divided.

I wish to thank Dr. E. T. Baker-Bates, Dr. C. Astley Clarke, and Mr. J. P. Heron, who have given me every assistance with their cases; and Dr. W. K. Taylor for his invaluable bacteriological work.

Liverpool. JOHN W. HALLAM.

TUBOCURARINE IN TETANUS

SIR,—The use of curare in the treatment of tetanus was suggested nearly seventy years ago, and in 1934 and 1935 Cole [1] reported cases in which it was employed with some success. The difficulty encountered at that time was the lack of standardised preparations, and therefore the establishment of a suitable dose was impossible. Further, there is only a narrow margin between the dose which will be effective in controlling the spasms and that which will affect seriously the respiratory muscles.

The introduction of tubocurarine and the wide experience gained in its use as an adjuvant to anæsthesia prompted its administration in a recent case. Although this case ultimately proved fatal, the injections of tubocurarine produced symptomatic improvement and were much appreciated by the patient, who repeatedly asked for them when the next dose was due.

The opportunities of treating tetanus in London are rare, and the purpose of this note is to indicate the dose of tubocurarine which was found satisfactory. The patient was a woman, aged 38, having an estimated body-weight of 7 st. Tubocurarine chloride 7·5 mg. by intramuscular injection every two hours produced maximum muscular relaxation without having any apparent effect on the respiratory mechanism.

Other features of interest in this case were that the patient had cut her finger in a hop-field one week before admission to hospital. The first symptoms, observed four days after the cut, were nasal regurgitation of fluid and difficulty in swallowing when having lunch. These symptoms were predominant throughout the duration of the condition, and the accumulation of saliva and mucous secretion in the mouth and pharynx was very troublesome. On the other hand, although there was considerable muscular rigidity, the spasms were relatively mild and infrequent and caused little evidence of exhaustion.

During the eleven days the patient survived in hospital it was impossible to administer any fluid or nourishment by mouth, but in spite of this there was no dehydration. The general condition was well maintained by the continuous intravenous infusion (great saphenous vein above the internal malleolus) of 5% glucose in $^1/_5$th normal saline, 2500 ml. every 24 hours. Heparin 10 mg. was added to each 1000 ml. Large doses of tetanus antitoxin (total 573,000 units) and penicillin (total 1,710,000 units) were administered in the drip infusion. As a sedative, paraldehyde 6 ml. every four hours was given by intramuscular injection.

The fatal termination of this case was attributed to the fact that early bulbar symptoms developed before treatment with antitoxin could be instituted, and in spite of the control of spasms by paraldehyde and tubocurarine.

Mile End Hospital, London, E.1. W. GORDON SEARS.

THE HEALTH OF AUTHORS

SIR,—Mr. Harold Nicolson's lecture before the Royal College of Physicians, published in your Nov. 15 issue, was delightful reading—such indeed as one expects from Mr. Nicolson. Its appearance in your journal, too, is a welcome relief from considerations of erythroblastosis fœtalis et al.

In his cogent and lucid exposition of the Nature of Inspiration, Mr. Nicolson defines inspiration as "a sudden flash or fusion between sense and fantasy, between reason and imagination," but he is careful to explain and to illustrate that it may vary in intensity and in degree, producing a physical revolt or reaction on the more acutely sensitive temperaments. And such a temperament is, as he says, most often found in the favoured, or afflicted, of the Muses.

Now Mr. Nicolson confines himself, and rightly, to his own chosen sphere—the art of letters. But so far as his lecture might be taken to imply by omission that the divine afflatus and oneiromancy are the peculiar prerogatives of poets and writers only, I would suggest that precisely similar phenomena have been experienced by mathematicians and scientists *pur sang*—and not without comparable stupendous flowering of result.

Two years ago—up to which time I had myself so wrong a notion—I came across Father Henry Gill's (S.J.) book *Fact and Fiction in Modern Science.* His very first chapter is headed Flashes of Genius, and two mathematicians of international repute, Sir William Rowan Hamilton and Henri Poincaré, are adduced to speak in the matter for themselves. While Father Gill is content to cite two examplars of inspiration, and dream, whose best work was due to such external influence, it may be presumed that they were no exceptions to what after all may be an inherent susceptibility in what some call "the human organism."

It is a commonplace that the practice of medicine is an art rather than a science; but a gathering of our profession may be said to approximate more nearly to a convention of scientists than a galaxy prostrate at the feet of the Muse. It is as scientists that we may find a little reflection salutary, even if Mr. Nicolson

1. Cole, L. B. *Lancet*, 1934, ii, 475; *Quart. J. Med.* 1935, 4, 300.

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refrained from asking whether we needed an apologia ourselves. At any rate with him we can be that much more on the side of the angels; and free to some extent at least from Sinclair Lewis's gibe when he called us "the men of measured merriment."

Finally, in renewing my thanks to Mr. Nicolson for a most enlivening and invigorating paper, may I take leave to ask him why he omitted mention of Christopher Smart and his *Song to David*? Sublime poetry and stark lunacy here go merrily hand in hand for dozens and dozens of stanzas. Selene and Euterpe may it seems bed together in silver peace. Perhaps someone else will tell us whether Urania sleeps alone? Or her fledglings the psychiatrist and the psychologist?

Cheslyn Hay, Staffordshire. L. DILLON MALONE.

TREATMENT OF BOILS

SIR,—With reference to the letters by Dr. Valentine (Nov. 15) and Dr. Foot (Nov. 1), I wish to say that I have been using systemic penicillin for boils and carbuncles for over nine months.

During the last six weeks alone I have dealt with seventeen patients suffering from boils and carbuncles situated in various parts of the body. The treatment consisted of one injection into the vastus lateralis muscle of 10 ml. oil-wax suspension of penicillin calcium, 125,000 units per ml. They all invariably noticed subsidence of pain and swelling, commencing between four and six hours after the injection, and all were discharged fit for work within 7 days. The reactions were pain radiating down the limb during the injection, followed sometimes by a severe fainting bout. There was stiffness of the injected limb, which lasted up to a fortnight. On the 8th day, in two cases, a gross swelling of the thigh and an itchy erythematous rash developed, which subsided in 3–4 days without any treatment. A few months ago I had two cases of urticarial reaction spreading over the whole body, following penicillin injection; one case I described in THE LANCET of July 5.

One word about local treatment—none. A piece of dry lint or gauze was placed on the discharging area, if any. This was replaced daily if the discharge was profuse. If there was a large sloughing area, a few grains of crystals of urea were sprinkled on daily.

Many of these patients had had previous attacks of boils and carbuncles, usually lasting for weeks, or even months, and these patients were all impressed by the dramatic improvement following the penicillin injection, and also by the absence of local treatment.

During the last six months I have noticed an enormous increase of boils and carbuncles. Next to the common cold, furunculosis has been the most prevalent disease amongst the patients attending my surgery, and I wonder whether other practitioners have had an experience similar to mine.

Sheffield. I. GOTTLIEB.

TYPHOID CARRIERS TREATED WITH PENICILLIN AND SULPHATHIAZOLE

SIR,—We have previously reported observations on two typhoid carriers treated with penicillin and sulphathiazole.[1] A further report is now presented to cover the first year after treatment.

Frequent specimens of early-morning urine and specimens of almost all stools passed were cultured for *Bact. typhosum* on Wilson and Blair's medium, and on desoxycholate agar plates inoculated direct and after incubating a portion of each specimen in selenite F. Many specimens of fæces and urine were also inoculated direct on MacConkey plates. Some 2500 culture plates were examined in each case. *Bact. typhosum* has not been isolated from any specimen. Agglutinations of sera against *Bact. typhosum* H, O, and Vi have also been carried out in both cases.

CASE 1.—This patient died on Nov. 1, 1946, from intercurrent pneumonia followed by lung abscess. Post mortem, there was no evidence in the organs of continuing typhoid infection. Bacteriological cultures from gut, biliary and urinary tracts, spleen, and lungs did not yield *Bact. typhosum*. From the first negative cultures during the course of treatment to death 198 days later, 534 samples from 137 stools and 272 samples of 136 urines did not yield the organism.

Results of serum agglutinations may be summarised as follows: *Bact. typhosum* H, initial titre 1/125 declined to 1/40 on Sept. 27, 1946; *Bact. typhosum* O, initial titre 1/50 rose to a maximum of 1/320 and then fell to 1/160 on Sept. 27, 1946; *Bact. typhosum* Vi was further reduced from the lowest value previously reported (+ in 1/5 dilution) to a trace (±) in 1/5 dilution on Sept. 27, 1946.

CASE 2.—This patient is alive and well, her physical condition being substantially better than before her treatment. During the year following the first negative cultures in the course of treatment bacteriological examination of 491 samples from 146 stools and of 314 samples from 157 urines did not yield *Bact. typhosum*.

Results of serum agglutinations: *Bact. typhosum* H, initial titre 1/500 fell to 1/80 on June 12, 1947; *Bact. typhosum* O, initial titre 1/50 rose to 1/160 and then declined to 1/20 on June 12, 1947; *Bact. typhosum* Vi, titre has remained roughly as previously reported, + being found in 1/5 dilution on June 12, 1947.

These two patients, both of whom before treatment freely excreted *Bact. typhosum* in their fæces, are regarded as having been cured of the typhoid carrier state, as much reliance being placed on the change in agglutination titres as on the negative bacteriological findings. The increase in *Bact. typhosum* O agglutination titre following the decrease in Vi titre observed in these cases has also been observed by one of us (W. W. K.) in one other typhoid carrier successfully treated with penicillin-sulphathiazole. It is hoped to report and discuss these and other agglutination results in detail on some future occasion.

We wish to thank Dr. L. C. Cook, medical superintendent of Bexley Hospital, for his continued interest; and the staff responsible for nursing the patients and our technical staff, in particular Mr. L. W. Tuttle and Mr. C. R. Wright, for their painstaking coöperation.

C. H. COMERFORD
Bexley (L.C.C.) Hospital. H. RICHMOND.*
Epsom Pathological Laboratory (London County Mental Health Services). W. W. KAY.

DEPERSONALISATION SYNDROME

SIR,—I read with interest and concern Dr. Shorvon's article in your issue of Nov. 15.

The cases he quotes in favour of prefrontal leucotomy seem to me not at all convincing. The price his patients have paid for their symptomatic improvement seems to be the loss of an essential human quality. For example, of case 4, a woman of 26, he reports: "Six weeks after the operation her father died suddenly, and she took it in an off-hand manner and was 'surprised.' Her attitude to her brother had completely altered, and she gets on well with him. 'I don't worry about him. I don't worry about anything any more.'"

As regards this brother she had experienced a deep unresolved conflict, for which she received "eight electric convulsion shocks and a course of modified insulin and narcosis without success." Later she "derived no benefit from psychotherapy, vasodilators, vitamins, amphetamine, epanutin, and narco-analysis."

Psychotherapy is often quoted in similar vein; "psychotherapy and a course of deep insulin had little effect."

Psychotherapy is not yet another method of treatment; it is an essential orientation. Depersonalisation is a defensive reaction against an unbearable conflict—problems of the patient's life which he is unable to face. The question is whether we are willing and able to face them with him, or not. This would remain no less true even if we knew the pathology of the depersonalisation syndrome on the somatic level, which we do not. We cannot talk about this condition as attacks which descend upon the patient—e.g., "he felt ill and weak after the onset of unreality," and "the 2 who had recovered immediately had had previous clear-cut attacks of unreality," and so on.

It is true that these cases are difficult to treat successfully, and that even for prolonged psycho-analytic

1. Comerford, C. H., Richmond, H., Kay, W. W. *Lancet*, 1946, ii, 343.

* Dr. Richmond has died since this communication was sent to us.—ED. L.

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treatment the prognosis is not too good. The psychoanalysis of such cases is a matter for specially skilled and qualified analysts and requires daily sessions over a period of three years; and it could therefore in any case be obtained only by a very few. If the necessary skill for analysis is present only in a few, this must be even more true for the general run of psychiatrists. Abbreviated treatment is even more difficult and demands even more experience, and it is still too time-consuming under our present conditions. My sympathy goes out to Dr. Shorvon and all harassed colleagues in their race against time and the overwhelming claims of this type of patient, particularly if they appear in numbers. It may well be that such emergency treatment as he reports is inevitable under present conditions. Moreover, it might be the only practicable measure for selected cases with a very unfavourable prognosis.

But this does not alter the fact that these patients are often exceedingly good material for psychological approach, if they are approachable at all; and all those I have seen have proved to be so. Dr. Shorvon's own beautiful quotations bear this out, but one can well believe him that "they have the utmost difficulty in describing their symptoms and in being understood."

In view of all this it seems to me of particular interest to mention that I have seen several such cases in group analysis, and all of them did exceedingly well, and that on genuine grounds. They regained their feelings, developed constructive insight, were able to see and face their problems, and showed self-progressive powers of integration. In short, they left treatment in a better state than they would have been likely to achieve if they had never developed "attacks of unreality." In at least three cases the depersonalisation syndrome was the outstanding feature, but it should be mentioned that they were all above average intelligence. Two of them stayed with their respective groups for under a year and had only one individual session per week in addition to the group session. One such case, diagnosed as "essential" or "primary" depersonalisation, attends at the present moment at St. Bartholomew's Hospital a weekly group analytic session—together with seven other patients—and she progresses very well indeed, without any supplementary individual session.

These results are due in no small degree to the superior power of the group situation, if it can be harnessed to the service of therapy.

London, W.1. S. H. FOULKES.

STREPTOMYCIN IN INFLUENZAL MENINGITIS

SIR,—Dr. Cormac's letter in your issue of Nov. 8 necessitates a reply from me.

In a disease such as influenzal meningitis in infancy, which had a mortality of almost 100% before specific therapy was introduced, an obvious clinical response to massive doses of penicillin in 3 cases, despite the bacteriological reports that the organisms were insensitive to penicillin, was suggestive that this "insensitivity" was merely relative to the concentration of penicillin used in the test. This was, in fact, confirmed by Dr. E. N. Allott in our last 2 cases, when he found the bacteria to be markedly sensitive to higher concentrations of penicillin; but the strains varied widely in their sensitivity. The clinical study of 4 cases of influenzal meningitis was therefore sufficient to prove that this disease will respond to massive doses of penicillin and that the view originally held, that *H. influenzæ* was insensitive to penicillin, was incorrect. Later, when reviewing the literature, I came across the paper by Gordon and Zinnemann,[1] who had made a similar observation in their laboratory on examination of eighteen different strains of *H. influenzæ*. They found all these to be inhibited by high concentrations of penicillin, but in very varying degree. Our clinical experience and independent conclusion was thus entirely in keeping with their bacteriological findings.

I therefore maintain that the use of streptomycin in the treatment of influenzal meningitis does not appear to be justified at present, owing to its limited supply, until penicillin in massive dosage has at first been tried and found ineffective. It seems to me to be more reasonable to confine its use at present to the treatment of as many cases as possible of the hæmatogenous forms of tuberculosis and for a clinical trial against infections due to other sulphonamide-resistant and penicillin-resistant bacteria.

St. Alfege's Hospital, London, S.E.10. B. GOTTLIEB.

1. Gordon, M., Zinnemann, K. *Brit. med. J.* 1945, ii, 795.

HORMONE TREATMENT BY IMPLANTING PELLETS

SIR,—In reviewing at the moment my cases of Simmonds's disease for detailed reporting, I am reminded that the general statement I made in my letter published on Oct. 11 applied to the more usual use of testosterone in eunuchoid cases, and I should be obliged if you would permit me to add that testosterone tablet implantations in Simmonds's disease, in women, are less well tolerated than in eunuchoidism, and not infrequently are extruded from the site of implantation.

It would appear, therefore, that not only the physicochemical properties of the implanted hormone but also the reactivity of the tissues are important; and that this reactivity is, at least to some extent, dependent upon the particular endocrinopathy.

London, W.1. S. L. SIMPSON.

RENAL CIRCULATION

SIR,—In their letter (Nov. 22) Dr. Trueta and Dr. Barclay state that at the meeting of the Physiological Society on June 15, 1946, they—

> "exhibited photographs and photomicrographs of kidneys that 'incline us to believe that the by-passing is effected, at least in part, via the vasa recta.' We demonstrated vasa recta with their loops *arising from glomeruli at the base of the cortex and at that time, called them basal glomeruli.*"

It is most unfortunate that this last sentence, especially that part which I have italicised, or its equivalent, was omitted first from their report in the proceedings of the Physiological Society (*J. Physiol.* 1946, **105**, 27) and secondly from their preliminary communication in THE LANCET (1946, ii, 237). Permit me to quote the pertinent paragraphs from these communications. In the first-mentioned they concluded:

> "Evidence . . . shows that short-circuiting of various degree can occur in the kidney and . . . that it can be accompanied by functional cortical ischæmia. This suggests a much greater degree of short-circuiting than could be accounted for by anatomical evidence so far published, and our investigations, though they are not yet complete, incline us to believe that the by-passing is effected, at least in part, via the vasa recta."

In the second they wrote:

> "The above observations show that as a result of appropriate nerve-stimulation the blood may be diverted wholly or partly from the cortex and short-circuited through medullary (especially subcortical) blood-channels. The large potential capacity of these by-passing channels enables them to transmit the whole of the renal blood inflow whenever the supply to the cortex is diverted and the latter thereby rendered ischæmic.
>
> "To locate the by-passing channels histologically, particulate material was injected in place of dyes, and was found to fill vasa recta and their loops, as well as a subcortical plexus of vessels (also of very much more than capillary calibre) suggesting that these two sets of vessels were the anatomical channels involved. These histological studies are being continued."

In brief, at first they considered the by-passing to be "effected, at least in part, via the vasa recta," and later they demonstrated "vasa recta and their loops, as well as a subcortical plexus of vessels . . . suggesting that these two sets of vessels were the anatomical channels involved."

There are two kinds of vasa recta in the kidney—vasa recta vera and vasa recta spuria. There is no indication which was thought to be concerned. Furthermore, in a matter affecting a short-circuit in the circulation in the kidney, a thing so fundamental as the glomerular or non-glomerular aspect of the short-circuit is omitted; indeed neither the word "glomerulus" nor "glomeruli" appear in either communication. However it was stated that the investigations were not yet

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completed and that the histological studies were being continued.

Such then was the declared stage when my letter appeared (*Lancet*, 1946, ii, 436) in which, following argument and examples, anatomical, physiological, and pathological, and finally mathematical, I stated:

> "... from a consideration of the hæmodynamics of the renal circulation in the rabbit, it is possible to suggest that the degree and character of the altered renal circulation, as outlined by Dr. Trueta and his colleagues, and the 'redistribution of blood-flow within the kidney' discussed by Professor Maegraith (p. 213), could be maintained by a circulation via the deep (subcortical or juxtamedullary) glomeruli only, the cortex being relatively avascular, by vasoconstriction of the peripheral arterial vessels in response to afferent (sciatic or other) stimuli."

My experimental work was first reported to, and demonstrated at, a meeting of the Pathological Society of Great Britain and Ireland held in July, 1941. This was the year in which I described the *juxtamedullary glomeruli*, as I mentioned at the recent meeting of the Royal Society of Medicine.

North Middlesex County Hospital, London, N.18. J. F. HEGGIE.

SPIRILLUM MINUS TREATMENT OF G.P.I.

SIR,—The records of the experiment in therapy described here were lost during the Malayan campaign. Dr. W. R. Logan, who investigated the cases clinically and made elaborate records of the progress of the patients, lost his life at the Alexandra Hospital when it was stormed by Japanese troops a few days before the surrender of Singapore. His death was a serious loss to psychiatry in the Far East and to many friends who appreciated his ability and personal charm.

General paralysis of the insane (G.P.I.) is by no means rare in the Federated Malay States. In 1940–41, when this investigation was carried out, we identified more than 100 cases by clinical and serological criteria in a population of rather more than 3000 patients at the Central Mental Hospital. The patients included Chinese, Malays, and Indians, the first-named predominating. Syphilis is prevalent among the Chinese and Indians in the cities and towns, but relatively uncommon among the riverine Malays, who are however subject to yaws.

The treatment of G.P.I. in Malaya presented two special difficulties. First, patients seldom reached the Central Mental Hospital until they were in an advanced state of physical and mental deterioration. Most of them had received no antisyphilitic therapy since they were first infected. About half the cases in this experiment were beyond treatment and could only be regarded as forlorn hopes. Only a few patients, who had held clerical appointments in the government service or had been in some other position that brought them to hospital relatively early in the course of their complaint, could be considered in any way promising material. The second difficulty was that most of the patients had had malaria, wherefore the possibility of successful malaria therapy was remote. Further, in the presence of anopheline mosquitoes capable of transmitting malaria there was the risk that other patients might be accidentally infected. Since we had no apparatus for inducing hyperpyrexia, we had to try some other method.

Sporadic cases of rat-bite fever (sodoku) are not uncommon in Malaya. During the latter part of 1940 one of us (J.O.P.) saw 2 cases. In the first case, though cultural methods failed, the infection was easily established in guineapigs. Two experimental infections made with guineapig blood did not give rise to an adequate fever, and this strain, though maintained for a while, was not used again. In the second case the infection was again established in guineapigs. Since this strain appeared to be more virulent it was used for the remainder of the experimental infections of cases of G.P.I.

No difficulty was encountered in maintaining the strains by passage in guineapigs. The animals were inoculated by the intraperitoneal route and about a week later became feverish, their eyes bloodshot, and their appetites poor. For one or two months their condition would slowly deteriorate, with loss of weight and an increasingly mangy appearance. They were then killed, and blood or liver emulsion from them was introduced into other animals. In this way an ample supply of blood for the inoculation of patients was always available.

Spirillum minus was repeatedly identified in the blood and livers of the guineapigs, both in wet and in stained preparations. The morphology of the two strains appeared to be identical, the spirilla varying greatly in length, number of spirals, and number of flagella.

Forty experimental human infections had been completed when war ended the investigation. In the first 6 cases guineapig blood was introduced into the skin of the arm. In 2 of these cases the development of fever was accompanied by serious ulceration spreading from the point of inoculation. In one case the ulcer spread until its diameter was about 6 in. and it had involved the underlying muscle to such a degree that the humerus was almost exposed. The healing that followed treatment with neoarsphenamine was remarkable, the scarring being far less than one could have believed possible. This method of introducing the infection was abandoned, and in the remaining cases a few drops of guineapig blood or liver emulsion diluted ten times with saline were injected into the antecubital vein with a fine needle, every effort being made not to allow any of the infected fluid to contaminate the skin or subcutaneous tissue. In a few cases a small ulcer developed at the site of inoculation, but in the remainder there was little or no local reaction.

The incubation period was seven or eight days in nearly all cases. A few patients had premonitory symptoms on the fifth or sixth day, and in a few others the onset of symptoms was delayed by a few days. Only in two or three cases was there a failure to infect at the first attempt, and in none of these was a second inoculation unsuccessful. The fever produced was satisfactory in a high proportion of cases, reaching a peak of 104°F, usually on the third evening after the onset of symptoms. In 2 cases a maximal temperature of 106°F was achieved. The fever was accompanied by considerable prostration, and the condition of some of the patients at this time was rather alarming because of their collapsed state and rapid and almost imperceptible pulse; yet no patient died during the febrile phase, and the recovery in their condition as the fever passed was remarkable. The temperature never remained high for more than 72 hours.

Most of the patients showed the typical dusky maculopapular rash during the fever, and in a few instances a hot bath revived the rash a day or two after it had apparently cleared. In those cases in which a leucocyte-count was made during fever there was a well-marked neutrophil leucocytosis and often an increased proportion of eosinophils. The second bout of fever usually occurred about the sixth day after the first and was usually as severe as the first and in a few instances more severe. In most cases the third cycle showed a falling off, and it was our usual practice to terminate the infection the day before the fourth or fifth rise of temperature was expected. In some cases one injection of neoarsphenamine 0·5 g. was insufficient, and in a week or so the temperature rose again. Three injections of 0·5 g. at intervals of five days never failed to terminate the infection.

Albuminuria was usually present during the pyrexial period, often with casts, and it tended to persist, though diminishing, even after the fever had been terminated. Four patients died in uræmia, and the tendency to a progressive nephritis was a serious drawback to this method of fever therapy. In view of the fact that *Treponema pallidum*, *Sp. minus*, and arsenic all have a predilection for inflicting renal damage it is perhaps surprising that there were not more deaths from uræmia. It is most unfortunate that the organs removed post mortem from these cases and preserved were never studied.

In about 6 cases spectacular improvement in the mental condition was judged by Dr. Logan to have taken place. One previously intelligent Malay, who had held a position of some responsibility in the government service and, though in an early stage of dementia at the time of treatment, was in good physical condition, apparently recovered completely; but his subsequent history is unknown. Some other patients also showed evidence of improvement. For about half the patients, many too advanced to be a fair test of the treatment, the only result was a further decline in their physical condition.

Adelaide. J. ORDE POYNTON.

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THE CHRONIC PARETIC

SIR,—I was interested in Dr. Kirman's article last week as I had made a similar investigation on a small series of 15 cases, the result of which was summarised in the *Annual Report of the Board of Control* (1933, part 2, p. 71). I then found that the minimum interval after malaria therapy for the establishment of negative reactions in the cerebrospinal fluid (C.S.F.) was eleven months. The Meinicke clarification reaction appeared to be the most sensitive and remained positive in the blood and C.S.F., but I have no doubt this too became negative after the lapse of more years. It is interesting to note that in Dr. Kirman's series nearly 50% showed negative blood Wassermann reactions. In my series they all became negative, but of course the number was too small for accurate statistical conclusions.

The important point to stress—I do not think this is too well known by general practitioners—is that the attainment of negative reactions by no means guarantees a cure.

I. ATKIN
Medical Superintendent.
Park Prewett Mental Hospital, Basingstoke.

TEACHING APPOINTMENTS

SIR,—Possibly I am attaching too much importance to the unsigned letter on the above subject which appeared last week; but the accusation that medical schools have appointed unsuitable persons to professorships of medicine is a serious one which appears to call for an answer, however irresponsible the accuser.

"M.R.C.P." tells us that he knows "from personal experience and the opinions of interested friends" that the teaching of medicine in many schools is of poor quality, and he apparently attributes this in large part to the appointment of "research-workers" to chairs of medicine. I cannot claim personal knowledge of all medical schools in the country; but I greatly doubt the validity of the writer's adjective, "many." And I can say, from personal acquaintance with numerous teachers in several schools and from knowledge of their students' opinion of them, that it is to those very teachers against whom "M.R.C.P." directs his criticism that I myself should turn to find examples of most of those qualities which he rightly implies to be desirable in those responsible for medical teaching—"knowledge of general medicine, clinical experience, ability to lecture, enthusiasm, and flare [sic] for teaching." "M.R.C.P." tells us that research-workers are often bad clinicians and poor teachers. That may be; but it is not from among this group, however valuable their contribution to society, that medical schools make their appointments to chairs of medicine.

J. G. MCCRIE
Dean, Faculty of Medicine.
The University, Sheffield.

SIR,—Your anonymous correspondent "M.R.C.P." has done well in directing public attention to the disastrous consequences of appointing teachers who cannot teach. Yet in the name of progress this policy has been adopted by our universities. In so doing, they have abandoned the first principles of education as known to western civilisation. To make this clear beyond a peradventure, I would quote a profound thinker and the greatest prose writer of the last century, Cardinal Newman [1]:

> ". . . when the Church founds a University, she is not cherishing talent, genius, or knowledge, for their own sake, but for the sake of her children, with a view to their spiritual welfare and their religious influence and usefulness, with the object of training them to fill their respective posts in life better, and of making them more intelligent, capable, active members of society.
>
> "Nor can it justly be said that in thus acting she sacrifices Science, and, under a pretext of fulfilling the duties of her mission, perverts a University to ends not its own, as soon as it is taken into account that there are other institutions far more suited to act as instruments of stimulating philosophical enquiry, and extending the boundaries of our knowledge, than a University. Such, for instance, are the literary and scientific 'Academies' which are so celebrated in Italy and France, and which have frequently been connected with Universities, as committees, or, as it were, congregations or delegacies subordinate to them. . . . The nature of the case and the history of philosophy combine to recommend to us this division of intellectual labour between Academies and Universities. To discover and to teach are distinct functions; they are also distinct gifts, and are not commonly found united in the same person."

1. The Idea of a University. 3rd ed. London. 1873. Pp. 12 and 13.

After Newman's stately prose I have nothing to add, save to answer in advance him who shall say: "You can't put the clock back." If your clock is wrong you put it right; and if you are approaching the brink of a precipice you go back—or perish.

HALLIDAY SUTHERLAND.
London, W.8.

FLARE-UP IN THE GLASS HOUSE?

SIR,—The feast of jugged hair (Nov. 22, p. 773) was suitably illumined by the weird glow of the flare in the next letter with its "flare for teaching." Spelling apart, we do not speak of "flair," but only of "*a* flair," and it means a keen nose for scenting the not very obvious; it does not mean a gift in general.

Prof. Pomfret Kilner himself is not quite blameless, for he writes "inapt": this is rightly condemned as a bastard blend of "inept" and "unapt."

AQUARIUS.

HANDKERCHIEFS IMPREGNATED WITH DISINFECTANT

SIR,—The possibilities of treating textiles with disinfectants are of considerable general interest.

We have recently had an opportunity to try out a relatively simple method of impregnation applicable to both cotton and woollen fabrics and capable of large-scale adaptation. In this method the fabric is first immersed in a solution of a soluble disinfectant—such as phenyl mercuric acetate—and this is followed by treatment with a solution capable of precipitating the disinfectant within the textile fibres in a relatively insoluble form: in the example quoted, sodium bromide would precipitate phenyl mercuric bromide.

A disinfectant suitable for this purpose would have to possess a very high phenol coefficient, as relatively little would diffuse out, and it would also require to be non-toxic. Preliminary tests with phenyl mercuric bromide have shown that a practical disinfecting action can be obtained on cotton handkerchiefs, but further investigation is necessary to exclude the possibility of toxic or irritant effects of this substance.

Although this method is still in the experimental stage, we thought its inherent possibilities and its potential importance in public health of sufficient interest to bring to your notice.

K. DUMBELL
J. E. LOVELOCK
E. J. LOWBURY.
National Institute for Medical Research Common Cold Research Unit, Harvard Hospital, Salisbury, Wilts.

Public Health

Tuberculosis in Lancashire

IN 1946 only 3·7% of all deaths in Lancashire were due to tuberculosis. Notifications of new pulmonary cases, which apart from a check in 1945 have risen steadily since 1939, reached 1663, the highest figure since 1927; men between 20 and 34 were chiefly affected, and Dr. F. S. Bradbury,[1] the central consultant tuberculosis officer, mentions the probable influence of war service in some of these cases. Deaths from pulmonary tuberculosis, though more numerous than in 1945, were lower than in the previous year. The chief rise in both sexes was in the age-group 35–44, whose responsibilities are most likely to interfere with treatment. In the age-group 15–24 there was a 13% reduction in pulmonary deaths; and this is attributed to earlier discovery of cases, in which mass radiography is held to have played a leading part. Notifications of non-pulmonary cases were only 104, the lowest figure on record, and 16% less than in 1945. Deaths from non-pulmonary tuberculosis also reached a new low record.

Sanatoriums were hampered by lack of staff, but have somehow managed to keep their beds full and their waiting-lists fairly short. In September, 1947, the

1. Report of the Tuberculosis Services of the Lancashire County Council, 1946. Preston: T. Snape. 1947. Pp. 42.

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waiting-list was 138 for the county, representing 10% of the number of beds occupied; and this percentage is much lower than the figure for England and Wales as a whole.

Poliomyelitis and Polioencephalitis

During the week ended Nov. 15 the fall in notifications of poliomyelitis, 186 (198), was again small, and there was a slight rise in those of polioencephalitis, 15 (12). Figures for the previous week are shown in parentheses. Notifications of poliomyelitis in London were 12 (16); and there was a small reduction in most of the southern counties except Kent 15 (4) and East Sussex 9 (3). The northern counties also showed reductions for the most part, but there was a slight upward trend in East Anglia and the west.

Infectious Disease in England and Wales

WEEK ENDED NOV. 15

Notifications.—Smallpox, 0; scarlet fever, 1947; whooping-cough, 1217; diphtheria, 195; paratyphoid, 8; typhoid, 11; measles (excluding rubella), 2355; pneumonia (primary or influenzal), 582; cerebrospinal fever, 40; poliomyelitis, 186; polioencephalitis, 15; encephalitis lethargica, 2; dysentery, 95; puerperal pyrexia, 117; ophthalmia neonatorum, 58. No case of cholera, plague, or typhus was notified during the week

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from measles, 3 (1) from scarlet fever, 3 (0) from whooping-cough, 2 (1) from diphtheria, 61 (4) from diarrhœa and enteritis under two years, and 13 (2) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 196 (corresponding to a rate of 25 per thousand total births), including 28 in London.

Medicine and the Law

Death or Injury "attributable to war service"

IN a lengthening series of appeals under the Pensions Appeal Tribunals Act of 1943 Mr. Justice Denning has had to decide whether a death or injury was "attributable to war service." This is not exclusively a medical question; the element of causation introduces arguments on which an appeal tribunal may misdirect itself. Two recent cases, decided in the present month, illustrate the difficulty. In one a man who had served in a balloon crew claimed that his hernia was a war injury. The conditions of his duty exposed him to the catching of a cold; he developed a cough, and a fit of coughing produced the rupture. One cause, perhaps a predominant cause, was the weakness of the abdominal wall; but one of the operative causes was his war service, and he was allowed a pension. In the other recent case, Monaghan *v.* Minister of Pensions, a man, 42 years of age, was working in Holland in the Pioneer Corps on the erection of a Bailey bridge. Some Canadians, it was alleged, gave the pioneers some gin, saying that it came from an abandoned Red Cross barge; the man drank and died two days later in hospital, having been admitted suffering from gin poisoning. The judge held that the cause of death was the drinking of raw spirit, an act entirely within his own personal sphere; the war service was only part of the surrounding circumstances. The pensions appeal tribunal rejected the widow's claim, and the judge refused to interfere.

Monaghan's case indeed was not unlike the Wedderspoon case, decided some months earlier, where a surgeon lieutenant on board his ship took a dose of chloral hydrate because he suffered from insomnia. He died in his sleep; post-mortem examination showed that he suffered from a weak heart. Mr. Justice Denning held death not to be attributable to war service. If the doctor had carelessly given an overdose to a member of the ship's company, the man's death would have been attributable to war service. But this dose was taken by the deceased in prescribing for himself. It was "the case of a man, who happened to be a doctor, taking too large a sleeping draught in his personal capacity . . . no more attributable to war service than the consequences of drinking too much or playing a game of squash."

The element of casuistry is intriguing. The leading decision of the judge is the Chennell case of last year. A boy found an incendiary bomb, took it into a Chertsey street, and played with it. There was an explosion which injured a girl who was passing by. The Ministry rejected her claim that it was a war injury entitling her to compensation. The pensions appeal tribunal allowed the claim and the judge approved. The dropping of the bomb by the enemy was a cause; the boy's interference was not so powerful an intervening cause as to supersede it.

The problems of causation are probably hardest where the ætiology of a disease is uncertain. A year ago, in the Donovan case, the judge found himself able to allow the widow's claim where her husband had died from Hodgkin's disease. Recently, in James *v.* Minister of Pensions, there was evidence that the claimant had a swelling on the right side of his neck which gradually spread. He was sent to hospital, where Hodgkin's disease was diagnosed; he was then discharged from the Army on this account. He claimed a war pension, having apparently heard of the Donovan decision. His case, said the judge, was shortly and simply this: "As I have never known any illness prior to entering the Forces, and as medical science has not been able to find out how Hodgkin's disease is contracted, I think I have more right to say that it is due to war service than you have in saying it is not!" His claim was rejected by the Ministry; he died, and his widow claimed again in vain. The claim was out of time and the right to a rehearing required decision, so that the final result is still awaited. In giving leave to appeal, the judge observed that it would be hard if Donovan's claim succeeded and that of James was rejected.

Can medical science establish that cancer is a disease attributable to war service? In Miller *v.* Minister of Pensions, decided last July, the illness of an Army officer serving in the Middle East had been diagnosed as carcinoma of the œsophagus. He was flown back to England and died soon after his arrival. The claim was regarded as a test case and was referred to Sir Ernest Rock Carling as an independent medical expert. The pensions appeal tribunal concluded that the probabilities as a whole were that war service played no part in the disease, though it was recognised that there was a possibility the other way. The judge, reviewing the evidence and some previous decisions, observed that the ætiology of disseminated sclerosis was unknown, but experience indicated that external factors could influence its onset and development; claims in respect of this disease had therefore been allowed. On the other hand schizophrenia seemed likely to be, in the great majority of cases, essentially independent of external causes; claims in respect of schizophrenia had therefore been rejected. "If nothing else appears except that the cause [of death or injury] is unknown, then the only proper conclusion is that the Minister cannot discharge the burden of proof, because the unknown cause may be a cause incidental to war service."

Finally two neurosis cases may be mentioned. The facts in W. *v.* Minister of Pensions (1946) were that a man was discharged from the Army as permanently unfit by reason of severe and chronic anxiety due to his domestic marital affairs. Here the judge held that the war service played no active part; the neurosis was caused by the wife's conduct; his war service had not

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aggravated the condition and therefore the claim failed. There was a similar result in the case of X.Y. *v.* Minister of Pensions last December. A soldier on embarkation leave had refused his fiancée's request that he should marry her before he went oversea. On return to his unit he received a letter from her in which she broke off the engagement. Four days later he shot himself in a military camp with a Service revolver. The pensions appeal tribunal held his death not to be attributable to war service. A military court of inquiry found that he met his death by his own hand while the balance of his mind was disturbed. The Ministry contended that the issue to him of a revolver and ammunition was an occasion for him to turn them against himself but not the cause of his so doing. The judge ruled that the cause was his trouble with his fiancée, a factor entirely extrinsic and unrelated to his Service life. These two cases perhaps were easier to decide, but even here the popular verdict might have gone the other way.

Parliament

FROM THE PRESS GALLERY

More about Our Calories

IN the House of Commons on Nov. 17, on the motion for the adjournment, Mr. E. P. SMITH pointed out that the British Medical Association's report on nutrition in 1933 demanded 3400 calories as the minimum daily diet to maintain working efficiency, and for people doing heavy work 3500–4000 calories were thought desirable.

In his brave but dispiriting speech on the Address, Sir Stafford Cripps had assessed our average daily intake of calories at 2870 which he admitted would have to be reduced. Mr. Smith thought that that reduction had probably taken place since the introduction of potato rationing. The Ministry of Food had stated that from rationed and pointed foodstuffs our daily average intake was 1530 calories, but very few of us, Mr. Smith believed, could in fact obtain the other 1340 calories from unrationed foodstuffs. The system of calculation used by the Ministry of Food had the essential demerit of over-simplicity. It consisted in dividing the amount of unrationed food consumed in the country—itself a notional figure—by the number of the population; and it included all meals consumed in restaurants and canteens, so that a poor old couple in a country village, who had no access to restaurants or canteens, were estimated to be receiving 2870 calories daily when, in fact, their intake was probably less than 2000 calories. A man in gaol, Mr. Smith concluded, received 2923–2955 calories daily, and a woman 2541–2605 calories; a boy in a borstal institution 2987–3051, and a girl 2521–2585 calories daily. In a dietetic sense, therefore, it paid nowadays to be an inhabitant of a gaol.

Dr. EDITH SUMMERSKILL, parliamentary secretary to the Ministry of Food, reminded Mr. Smith that the method of taking the amount of food consumed and dividing it by the population was devised not by her department but by the Scientific Committee set up during the Coalition Government by the Combined Food Board. Whatever its shortcomings it was a valuable means of comparing one period with another and the conditions prevailing in one period with those prevailing in another.

She also thought that Mr. Smith did not appreciate that the consumption levels quoted by her department were generally the average because they were asked for the average. There were of course wide variations in individual intake; when it was suggested the average calorie intake of the whole population was 2800, that included the intake of 900 calories by an infant and 4500 by a heavy worker. In quoting the number of calories consumed by a prisoner Mr. Smith was taking a specific number of calories consumed by one man doing a particular job. That could not be justly compared with an average for the whole country. Again, the average intake of an adult man might vary from 2500 calories to 4500 calories daily, and of an adult woman from 2000 to 3000 calories. The nursing mother, for instance, got 3000 calories a day. One hot meal a day, Dr. Summerskill added, equalled 900 calories, and one snack 500 calories, and when the average of a family was taken, it must be remembered that where the wage-earner was feeding outside the food he would otherwise consume was consumed by the family.

QUESTION TIME

Source of Our Calories

Mr. G. R. CHETWYND asked the Minister of Food whether he would give the calorie content of the no. 2 diet suggested for an adult man by the British Medical Association in 1933; and of the present average diet in the following proportions: proteins, fats, and carbohydrates.—Dr. E. SUMMERSKILL replied: Of the 3386 calories in the B.M.A. diet no. 2, 12% were derived from protein, 28% from fat, and 60% from carbohydrate. The corresponding proportions in the present-day average diet are 12%, 33%, and 55% respectively.

Rehabilitation Centres in Scotland

Mr. E. G. WILLIS asked the Minister of Labour if he would consider the establishment of an Industrial Rehabilitation Centre in Scotland.—Mr. NESS EDWARDS replied: It is hoped to open early in 1948 two industrial rehabilitation units attached to Government training centres in Scotland; one at Hillington, Glasgow, and one at Granton, Edinburgh. Each unit will have accommodation on a non-residential basis for 100 persons.

Government Grants for Cancer Research

Mr. P. FREEMAN asked the Lord President of the Council what was the total grant made from Government funds for the purpose of cancer research in each of the last 20 years; and in what form it was proposed to continue these grants after the Public Health Act, 1947, came into operation.—Mr. H. MORRISON replied: Expenditure on cancer research from the parliamentary grant-in-aid for the work of the Medical Research Council has been at the rate of approximately £6000 per annum during the greater part of the period mentioned, this provision being of course supplementary to the much larger expenditure from the endowments and other resources of unofficial organisations concerned with this particular field. Expenditure from the same source in the financial year 1946–47 was about £12,000, and expenditure in the present financial year is estimated at £31,000 (including £14,000 of a non-recurrent nature). Substantial additional expenditure in the future has been approved for research on applications of atomic physics to the treatment of cancer. These activities are not affected by the National Health Service Act, 1946.

Mr. SOMERVILLE HASTINGS: Is the sum mentioned sufficient for the legitimate demands of those who are engaged in this research?—Mr. MORRISON: I think so, in the light of the useful activities which can be conducted. Considerable sums are being spent elsewhere in the field of research under the auspices of the Ministry of Health, hospitals, and what not. I do not think there is any difficulty about money, but I would be prepared to consider further developments if useful avenues of research were available to us.

Future of Private Homes

Mr. H. CHANNON asked the Minister of Health whether, in drawing up detailed plans for the National Health Service, he could give an assurance that everything would be done to assist and encourage the provision of private registered nursing and maternity homes to supplement the main hospital scheme.—Mr. A. BEVAN replied: Private homes are outside the scope of the National Health Service Act, and their future must therefore depend on the demand for private treatment outside the service.

Accommodation for Mental Defectives

Mr. W. R. SORENSEN asked the Minister what progress had been made during the past twelve months in providing accommodation for mental deficients; and approximately how many mental deficients were now awaiting suitable institutional accommodation.—Mr. BEVAN replied: Premises acquired by local authorities will provide 160 beds in the immediate future. Further accommodation will be available in the new year in three mental deficiency colonies released by Service departments. Mental defectives awaiting institutional accommodation were 3890 on Jan. 1 last.

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Obituary

WILLIAM SEAMAN BAINBRIDGE

M.D., SC.D.

WE have received from Mr. Sampson Handley the following tribute to Dr. W. S. Bainbridge of New York, who died on Sept. 22. "In the years before the first world war," Mr. Handley writes, "Bainbridge was a frequent visitor to Europe, and wherever he went his kindly personality, his abounding energy, his open-mindedness, and his genius for friendship made him the welcome ambassador of American to European surgery. Dr. Bainbridge's book, *The Cancer Problem*, gave a catholic account of its subject, with full and fair recognition of English workers, such as Bashford, Murray, and Lazarus-Barlow, and of the clinical work of British and Continental surgeons and of its author. It was translated into French, Italian, Spanish, Polish, and Arabic. In both world wars he served in the American Navy, and as medical inspector and commander Reserve Force had much to do with the training of young American naval surgeons. His many honours, governmental and academic, included decorations from 18 nations. Bainbridge lived a full life, and his work survives him to mould the future."

ROBERT CARMICHAEL WOOD

M.B. EDIN., M.R.C.P.E.

Dr. R. C. Wood, who died on Nov. 23, graduated at the University of Edinburgh in 1932 and took his M.R.C.P.E. four years later. After qualifying he held resident appointments in Edinburgh at the Royal Maternity Hospital, the Hospital for Sick Children, and the Royal Infirmary. During the late war he served in the R.A.M.C., with the rank of major, as a medical specialist at a general hospital in the Middle East, and in 1945 (with K. C. Dixon) he published a paper on tick-borne relapsing fever in Cyprus.

G. A. G. P. and R. W. D. T. write: "Many war-time friends will regret the early death of Bertie Wood, in addition to the wide circle in Edinburgh and, of course, his patients. He had more than his share of service overseas and none longed more deeply to be home again. In those trying days he was a great colleague; not only a good physician, hard working, reliable, and loyal, but one of those whose companionship made all the difference to his friends. We shall miss him sadly down the years."

Births, Marriages, and Deaths

BIRTHS

COX.—On Nov. 14, the wife of Dr. P. J. N. Cox—a daughter.
EVANS.—On Nov. 11, at Worcester Park, the wife of Dr. E. A. Evans—a son.
GARROD.—On Nov. 19, in London, the wife of Dr. Oliver Garrod—a son.
KING.—On Nov. 19, at Wellington, New Zealand, the wife of Dr. A. S. King—a son.
LISTER.—On Nov. 17, the wife of Mr. Arthur Lister, F.R.C.S.—a son.
PALEY.—On Nov. 16, the wife of Dr. R. G. Paley—a daughter.
TODD.—On Nov. 14, at Bath, the wife of Dr. W. A. Todd—a daughter.

MARRIAGES

BROADBENT—LLOYD.—On Nov. 15, John Dennis Broadbent, M.R.C.S., to Judith Lloyd.
BUSH—FARNSWORTH.—On Nov. 1, at West Norwood, John Peter Bush, M.R.C.S., to Edith Mary Farnsworth.
NICHOLSON—MARSHALL.—On Nov. 15, David Percy Nicholson, M.B., to Mary Marshall.
WHOWELL—MURRAY.—On Nov. 15, in London, William Brian Whowell, M.B., to Joy Murray.

DEATHS

ATKINSON-FLEMING.—On Nov. 14, in London, Frederick Charles Atkinson-Fleming, M.C., B.A., M.B. Dubl., major, R.A.M.C. retd.
BENTALL.—On Nov. 16, William Charles Bentall, O.B.E., F.R.C.S.E., aged 72.
COSGROVE.—On Nov. 17, at Sydney, Australia, Charles Cosgrove, M.C., L.R.C.P.E.
EAVES.—On Nov. 21, Elizabeth Cowper Eaves, M.D. Lond., D.P.M.
FARQUHARSON.—On Nov. 16, in London, George Sinclair Farquharson, M.B. Lond., aged 84.
KNIGHT.—On Nov. 18, at Painswick, Charles Voughton Knight, M.D. Lond., aged 75.
MOFFAT.—Robert Unwin Moffat, C.M.G., M.D. Edin.
MONTGOMERY.—On Nov. 19, at Wolstanton, Staffs, Anna Pauline Montgomery, M.D. Lond.

Notes and News

COMMITTEE ON CERTIFICATES ISSUED BY PRACTITIONERS

A COMMITTEE has been appointed jointly by the Minister of Health and the Secretary of State for Scotland to investigate "how far it would be practicable to reduce the number of certificates to be signed by medical practitioners." The committee comprises: Mr. Archibald Safford, recorder of Faversham (chairman); Dr. J. C. Arthur, Gateshead; Miss Florence Hancock, chairman of the general council of the Trades Union Congress; Dr. Walter Jope, Glasgow; Mr. A. W. Neville, former principal assistant secretary in the Ministry of Health; and Mr. R. L. Briggs, Ministry of Health (secretary). The medical members were nominated by the British Medical Association.

FOOD AND HEALTH

IN the latest edition of his textbook[1] Prof. Henry C. Sherman, of New York, makes some points that are especially germane to the present situation. Having spent a life-time thinking and writing on his subject, he looks at the wood as well as the trees, and the landscape as well as the wood. He is attracted to Smuts's "holism," pointing out that evolution has proceeded among organisms availing themselves of the whole of other living organisms, and suggests that we are flying in the face of nature if we make use of highly refined commercial food products. Instead of asking for, and providing, more protein, calories, vitamins, and mineral elements, we should demand more milk, eggs, fish, fruit, and green vegetables—whole foods rather than their chemical constituents.

What is the advantage of adopting sound nutrition? Professor Sherman gives many answers, one of them quantitative. At Harvard, he says, King found that the chance of an infant being essentially a perfect specimen and showing robust health was four times greater when the mother's diet had been superior (graded "good" or "excellent"); and that the risk that the infant would have a low health rating was twenty times greater when the mother's diet had been inferior (graded "poor" or "very poor"). If these Harvard findings applied throughout the country, better nutrition in American homes would mean that well over a million babies each year would start their lives at a higher health level.

To those pessimists who fear the tendency among civilised peoples towards communities with an excess of middle-aged and elderly people, he points out that individuals most often attain their opportunities for highest service at about 45–50 years of age—i.e., when there remains but a third of the traditional span. The shortness of individual lives sets a limit to the actual use by man of the knowledge he has accumulated and the institutions he has built and developed. Sound life-long nutrition adds to the period of the flowering and fruiting of human intelligence, and therefore to the permanent well-being of the human race—a stimulating thought for those "past meridian."

HOMES OF ST. GILES

THE dread of the leper is largely misplaced. As we have lately noted,[2] only a small proportion of lepers are even potentially infective, and of the two or three hundred in this country the few who are infective can be taught to manage their disease so that it is not dangerous to others. For those who are unable to live at home one small colony exists—the Homes of St. Giles. This little-known charity was founded in 1914, and in an account of it[3] Dr. J. M. H. MacLeod, the chairman, tells how it was first housed in temporary buildings on a small farm in Essex. Now the temporary buildings have given place to comfortable brick bungalows, each with its own bed-sitting-room, kitchenette, and bathroom. A larger communal bungalow houses dining-room and kitchen, and a medical bungalow is equipped with an operating-room. The recreation hall is furnished with a billiards-table and a stage, and the patients have wireless sets in their bungalows. Occasionally the wives of non-infective patients are able to come to live with their husbands in the bungalows, and share in the nursing and domestic work of the colony. There

1. Food and Health. New York and London: Macmillan. 1947. Pp. 290. 20s.
2. *Lancet*, 1947, i, 487.
3. The Homes of St. Giles for British Lepers. 1947. Obtainable from the secretary, 170, Bishopsgate, London, E.C.2.

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is also a guest-house, and a chapel has been made in the old farmstead barn.

The medical work is done by two visiting medical officers who live near by, advised by consultants from London. The nursing, originally undertaken by an Anglican sisterhood, is now the charge of sisters from the community of the Sacred Passion who have the care of lepers in East Africa. At present the homes take 10 men and 3 women, and also treat a few non-infective cases as outpatients, and nearly 60 patients have been treated since the homes opened.

The homes are a limited-liability company trading without profit, and are managed by an executive committee appointed by a council. Unaided by any Government grant, they depend for support on subscriptions and donations. Hard times are affecting the means, though probably not the will, of givers, and new subscribers are urgently needed. Those who wish to help should send their contributions to Mr. Arthur Stanley, the secretary, at 170, Bishopsgate, London, E.C.2.

KEEPING THE ENGINE WARM

A MECHANICALLY minded peripatetic correspondent, writing in 1942,[1] urged some enterprising manufacturer of electrical equipment to produce a gadget for starting a car off the mains—via a 12-volt transformer—and at the same time keeping the engine really hot when not in use by means of immersion heaters in the radiator. His hopes have partly been fulfilled, for immersion heaters for the radiator are now on the market. A simple form is that made by Messrs. Runbaken Electrical Products, of Manchester, in which the heater screws into the hole for the drain tap at the bottom of the radiator. When the car is in the garage the heater is connected to the mains, via a 12-volt transformer which also keeps the battery charged. If the car is left standing in a car-park or elsewhere the heater can be worked by the battery. The current consumption is 100 watts from the mains or 50/60 watts from the battery. Apart from ensuring easy starting such an immersion heater should save the petrol now used in warming up the engine.

Two simpler types of heater are worth considering, though these will not charge the battery. One—"Peter the Heater"—hangs inside the bonnet like a Davy lamp. Made by L. G. Hawkins, of Drury Lane, it consists of an element enclosed in a perforated cage, and runs from a light plug. The other is the Belling Air-warmer, a non-luminous type of heater made in cast-iron, which can be fixed horizontally to the garage wall. A number of projecting fins provide a large heating surface, and this device is both compact and safe. To the doctor who has often to start his car in the middle of the night even in winter, a heater is a valuable ally.

University of Cambridge

On Nov. 15 the degree of M.D. was conferred on E. B. Jarrett and N. D. Compston.

University of Sheffield

Prof. H. N. Green, who occupies the chair of pathology, has been granted the additional title of director of cancer research.

Having retired from the position of medical officer of health for Sheffield, Dr. John Rennie has resigned from the university chair of public health.

Royal College of Surgeons of England

A course of 72 lectures on anatomy, applied physiology, and pathology will be given at the college from April 5 to May 25 daily at 3.45 and 5 P.M. Practical demonstrations in these subjects will also be held daily from March 22 to June 11 from 10 A.M. to 1 P.M., and from 2 to 3.30 P.M. The demonstrations will only be open to those attending the lectures and will be limited to 40 students; preference will be given to those unable to obtain practical instruction elsewhere, and to ex-Servicemen. Applications should be sent to the secretary of the postgraduate education committee of the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2, before Feb. 2 for the demonstrations, and before April 3 for the lectures.

Owing to the rise in costs, from Jan. 1 the charge for the monthly college dinners will be increased from £1 1*s.* to £1 5*s.*

Royal Institute of Philosophy

The King has accorded the title of Royal to the British Institute of Philosophy.

1. *Lancet*, 1942, i, 304.

British Association of Allergists

At a meeting held at Oxford on Nov. 15, it was decided to form this association, and the first general meeting will take place at St. Mary's Hospital, London, on Jan. 24. The speakers will include Dr. John Freeman and Mr. Frank Coke. Dr. A. W. Frankland, Wright-Fleming Institute of Microbiology, St. Mary's Hospital, Paddington, W.2, is the secretary of the new association.

Production of Penicillin

The penicillin factory at Speke which has been operated by the Distillers Company, as agents for the Minister of Supply, since December, 1945, will become a commercial undertaking on Dec. 1. A new company, the Distillers Company (Biochemicals) Ltd., has been formed especially for the purpose, and arrangements have been made for the entire output of penicillin (sodium and calcium salts), to be distributed by the following pharmaceutical houses: Allen & Hanburys, Boots Pure Drug Co., The British Drug Houses, Burroughs Wellcome & Co., Evans Medical Supplies, Imperial Chemical (Pharmaceuticals), Pharmaceutical Specialities (May & Baker).

Specialist Appointments in the L.C.C. Service

The London County Council last week approved a scheme for the enlargement of specialist staffs in the council's hospitals. In general, one position of medical superintendent, deputy medical superintendent, or senior resident medical officer has been abolished for each new specialist position. The following promotions have been made:

Senior physicians (*superintendents*), on a salary scale of £1500–£100–£1800 and house valued at £150 or allowance in lieu:

J. C. Evans, M.R.C.P., W. Feldman, M.R.C.P., W. G. Sears, M.R.C.P., B. A. Young, M.R.C.P. (all commencing at £1800).

Senior physicians (*deputies to superintendents*), on a salary scale of £1500–£100–£1800 with no emoluments and £50 a year as deputy:

Major H. C. Aston, M.R.C.P., R. D. Green, M.R.C.P., T. St. M. Norris, M.R.C.P., D. W. G. Smith, M.R.C.P., M. I. Toohey, M.R.C.P., C. E. W. Wheaton, M.R.C.P.

Senior physicians, on a salary scale of £1500–£100–£1800 with no emoluments:

J. A. Cardno, M.D., B. Freedman, M.R.C.P., B. Gottlieb, M.R.C.P., P. Harvey, M.R.C.P., Major A. Kahan, M.D., Wing-Commander J. H. G. Mason, M.R.C.P., Lieut.-Colonel H. E. S. Pearson, M.R.C.P.

Surgeon specialists (*superintendents*), on a salary scale of £1500–£100–£1800 and house valued at £150 a year or allowance in lieu:

W. P. Greenwood, F.R.C.S., R. A. V. Lewys-Lloyd, F.R.C.S., J. M. Milloy, F.R.C.S., J. R. M. Whigham, F.R.C.S. (commencing at £1800); J. E. Piercy, F.R.C.S.E. (commencing at £1500).

Surgeon specialists (*deputies to superintendents*), on a salary scale of £1500–£100–£1800 with no emoluments and £50 a year as deputy:

H. L. Cochrane, F.R.C.S., G. S. Ferraby, F.R.C.S., J. Gabe, F.R.C.S., J. C. Gillies, F.R.C.S.E., S. W. Holmes, F.R.C.S., I. W. Matheson, F.R.C.S., I. I. Price, F.R.C.S., K. F. D. Waters, F.R.C.S.E.

Surgeon specialists, on a salary scale of £1500–£100–£1800 with no emoluments:

T. J. Eason, F.R.C.S., Major A. N. McCrea, F.R.C.S., H. K. Vernon, F.R.C.S.

Physician superintendents, on a salary scale of £1500–£100–£1800 and house valued at £150:

J. S. Anderson, M.D., J. V. Armstrong, M.D., H. S. Banks, F.R.C.P., N. D. Begg, M.D., F. J. Bentley, F.R.C.P., W. C. Fowler, M.D., J. Watt, M.D. (commencing at £1800); J. C. Blake, M.B., William Gunn, F.R.C.P., W. H. Kelleher, M.D., M. H. Logg, M.D., G. W. Ronaldson, M.D., W. E. Snell, F.R.C.P. (commencing at £1700).

Assistant senior physicians (*deputies to physician superintendents*), on a salary scale of £1000–£50–£1400 with no emoluments and £50 a year as deputy:

Robert Swyer, M.R.C.S. (commencing at £1300); G. E. Breen, M.D., L. J. M. Laurent, M.R.C.P., J. C. McEntee, M.R.C.P. (commencing at £1250); J. W. Healey, M.D. (commencing at £1200); A. M. Ramsay, M.D. (commencing at £1150); W. J. P. Lillis, L.R.C.P.I., J. J. McCann, M.R.C.P., D. Porter, B.M., W. F. Richards, M.R.C.P. (commencing at £1050).

Assistant surgeon specialist (*deputy to medical superintendent*), on a salary scale of £1000–£50–£1400 with no emoluments and £50 a year as deputy:

R. Glyn Thomas, F.R.C.S. (commencing at £1150).

As announced last week, Brigadier R. H. Metcalfe, F.R.C.S., and Lieut.-Colonel R. C. F. Catterall, F.R.C.S., have been appointed to the service as surgeon specialists; their salary scale is £1500–£100–£1800 with no emoluments.

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London Association for Hospital Services

Dr. W. Russell Brain has been elected chairman of this association in succession to Sir Bernard Docker, who will continue to serve as a member of the council.

Indian Obstetrical Congress

The fifth All India Obstetric and Gynæcological Congress will be held in Bombay from Dec. 25 to 29 under the presidentship of Sir A. Laxman Swami Mudaliar.

Medical Drawings

For the past year a group of students in the commercial art department of the St. Martin's School of Art (L.C.C.) have been trained in pathological drawing. They have also obtained practical experience by making drawings in operating-theatres of London hospitals. Surgeons or hospitals who may wish to employ them are invited to get in touch with the principal of the school, 109, Charing Cross Road, W.C.2.

Services Award

The North Persian Forces memorial silver medal for 1946 has been awarded to Dr. J. N. McArthur for his article, Malaria Transmission in Borneo, which was published in THE LANCET (1946, ii, 117). The medal is awarded for the best paper on tropical medicine or tropical hygiene published by a medical officer of under twelve years' service in the Royal Navy, Royal Army Medical Corps, Royal Air Force, Indian Medical Service, or Colonial Medical Service.

Speech Therapy Conference

The College of Speech Therapists is holding a conference in London from Sept. 20 to 24, 1948, when there will be sessions on the following subjects: Aim and Scope of Speech Therapy, Speech Disorders arising from Head Injuries, the Speech Clinic and the Speech Defective Child, and the Rôle of Emotional Problems in Producing Disorders of Speech. It is hoped that during the conference an International Federation of Speech Therapists will be set up again. The conference secretary's address is 68, Queen's Gardens, W.2.

Appointments

BONNIN, J. G., M.B. Melb., F.R.C.S., M.R.C.O.G.: first assistant, orthopædic and accident service, Oldham Royal Infirmary.
CAPLIN, MAXWELL, M.R.C.S.: tuberculosis officer, London Chest Hospital.
CUNLIFFE, A. C., M.A., M.D. Camb.: asst. bacteriologist and lecturer in bacteriology, King's College Hospital, London.
DEAN, J. H., B.A., M.B. Camb.: university asst. pathologist, Addenbrooke's Hospital, Cambridge.
DEAN, JOHN, M.B. Camb.: Wander scholar and registrar, Westminster Children's Hospital.
FINLAYSON, A. A., M.B. St. And., F.R.C.S.E.: otorhinolaryngologist, Hospital of St. Cross, Rugby.
JOULES, F. E., M.D. Lond., M.R.C.P.: chief assistant in medicine, Harefield County Hospital, Middlesex.
SUTHERLAND, CATHERINE, M.B. Edin.: asst. M.O., maternity and child-welfare department, Birmingham.
WALSH, BRIDGET, M.B. N.U.I., D.P.H.: medical director, mass-radiography unit, Leeds.
WOOLGROVE, C. G., M.B. Birm., D.P.H.: senior asst. school M.O., Coventry.

Queen Elizabeth Hospital for Children, London:

EVANS, C. F., F.R.C.S., D.L.O.: ear, nose, and throat surgeon.
HARRIS, E. O., M.B. Lond., F.R.C.S.: ear, nose, and throat surgeon.
SWAIN, V. A. J., F.R.C.S.: surgeon.

Bristol Eye Hospital:

BARTLETT, C. H., B.A., M.B. Camb., F.R.C.S.: surgical registrar.
WEAR, A. R., M.B. Leeds, D.O.: ophthalmic registrar.

West Bromwich and District General Hospital:

CANT, W. H. P., M.D. Lond., M.R.C.P.: pædiatrician.
WILLIAMS, G. E. O., M.D. Lpool, M.R.C.P.: physician.

London County Council Mental Health Service:

DUNKLEY, E. W., M.B. Lond., D.A., D.C.H., D.P.M.: second asst. M.O., St. Pancras Hospital mental observation unit.
FRYER, G. J. F., M.B.: asst. M.O., St. Bernard's Hospital, Southall.
LANTIN, HAROLD, M.B. Belf.: asst. M.O., Long Grove Hospital, Epsom.
MAY, P. R. A., M.B. Camb., D.P.M.: second asst. M.O., Cane Hill Hospital.
NICHOLSON, BERNARD, M.R.C.S.: asst. M.O., Banstead Hospital, Sutton.
SAINSBURY, PETER, B.A., M.B. Camb., D.P.M.: asst. M.O., Bexley Hospital.
VINCENZI, J. E. G., M.R.C.S.: asst. M.O., Claybury Hospital.

Colonial Service:

ALMOND, ISABELLA, M.B. Sheff.: M.O., Malaya.
EMMERSON, E. N., M.R.C.S., D.T.M. & H.: M.O., Tanganyika.
FERNANDES, H. P., M.R.C.S., D.T.M. & H.: health officer, tuberculosis, British Guiana.
RAM, L. M., M.B. Punjab, M.R.C.P., D.P.H.: M.O., Malaya.
SAMPEY, A. W., M.R.C.S.: M.O., Kenya.
WASE-BAILEY, B. N. V., M.D. Edin., D.T.M. & H., D.P.H.: senior M.O. (health), Sierra Leone.

City of Plymouth Mental Hospital

This hospital, previously known as Blackadon, has been renamed Moorhaven Hospital. The early treatment unit will continue to be known as Moorfields Hospital. The postal address of both is Ivybridge, South Devon.

Faculty of Homœopathy

On Thursday, Dec. 4, at 5 P.M., at the London Homœopathic Hospital, Great Ormond Street, W.C.1, Mr. Harold Dodd will speak on Five Ailments Aggravated by Present Austerity Conditions.

Dr. Arthur Metcalfe, Australian director-general of health and quarantine, is reported by B.U.P. to be leaving Australia on Dec. 14 for a three-months tour of Britain, Canada, and the United States. He will investigate methods of quarantine in relation to air travel.

CORRIGENDA: *Estimation of renal activity.*—The last sentence of the third paragraph in Mr. Cole's letter last week (p. 774) should have read: "Where U is the urinary concentration, P the plasma concentration, and V the minute-volume of urine, the clearance, represented by UV/P, can remain the same although U rises."

Malaria transmission by blood-transfusion.—The name of the correspondent who wrote a letter to the Editor on this subject last week (p. 772) was Dr. K. S. Rodan.

Diary of the Week

NOV. 30 TO DEC. 6

Monday, 1st

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. A. Peacock: Middle Ear and Eustachian Tube.
5 P.M. Dr. J. Douglas Robertson: Disordered Metabolisms in Thyrotoxicosis and Myxœdema.
WESTMINSTER HOSPITAL, Horseferry Road, S.W.1
5 P.M. (Meyerstein lecture theatre.) Clinicopathological demonstration of osteogenic sarcoma.

Tuesday, 2nd

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. H. A. Harris: Anatomy of the Bladder and Prostate.
5 P.M. Prof. G. Payling Wright: Pathology of Primary Tuberculous Infection. (First lecture.)
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. R. M. B. MacKenna: Erythema Group of Eruptions.

Wednesday, 3rd

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Mr. H. F. Lunn: Flexor and Extensor Retinacula of Wrist and Ankle.
5 P.M. Prof. Payling Wright: Pathology of Primary and Tuberculous Infection. (Last lecture.)
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2.30 P.M. *History of Medicine.* Dr. E. Ashworth Underwood: Charles Creighton (1847–1927)—Scholar, Historian, and Epidemiologist. Prof. M. Greenwood, F.R.S.: Epidemiology of Creighton.
8 P.M. *Surgery.* Sir Gordon Gordon-Taylor, Mr. R. McWhirter, Sir Stanford Cade: Carcinoma of the Breast.
SOCIETY OF CHEMICAL INDUSTRY
7 P.M. *Food Group with Society of Public Analysts and other Analytical Chemists.* (Burlington House, Piccadilly, W.1.) Mr. G. E. Forstner, A.R.I.C., Mr. G. W. Monier-Williams, PH.D., Mr. W. F. J. Cuthbertson, A.R.I.C., Mr. N. L. Allport, F.R.I.C., Mr. D. E. Garratt, PH.D.: Occurrence, Physiological Importance, and Estimation of Metallic Contaminants in Foodstuffs.
ROYAL FACULTY OF PHYSICIANS & SURGEONS, 242, St. Vincent Street, Glasgow
5 P.M. Dr. William Evans: Heart Murmurs. (Finlayson lecture.)

Thursday, 4th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. D. V. Davies: Osteology of the Base of the Skull.
5 P.M. Dr. W. Feldberg: Vasodilatory Nerve Mechanisms.
ROYAL SOCIETY OF MEDICINE
8 P.M. Mr. W. Grey Walter, D.SC.: Electro-encephalogram in Organic Cerebral Disease.
INSTITUTE OF DERMATOLOGY
5 P.M. Dr. R. T. Brain: Filtrable Viruses.

Friday, 5th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. J. D. Boyd: Development of the Liver and Pancreas.
5 P.M. Prof. R. Hare: Source and Transmission of Nasopharyngeal Infection.
ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Mr. I. Simson Hall, Dr. A. Young: Penicillin Treatment in Acute Suppurative Otitis Media.
2.30 P.M. *Laryngology.* Mr. G. H. Bateman: film on Organic Disorders of the Larynx. Mr. V. E. Negus: Bell Telephone film of the Laryngeal Movements.
5.30 P.M. *Anæsthetics.* Dr. J. K. Hasler: Posture in Anæsthesia.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. S. Roodhouse Gloyne: Pneumoconiosis.

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DES MOINES, IOWA

TEACHERS OF MEDICINE *

F. M. R. WALSHE
M.D., F.R.S.
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IT is fifteen years since Wilfred Trotter stood where I now stand and opened the session of 1932–33 in an address whose ripe wisdom, large humanity, and eloquence remain an inspiration and delight. His title was Art and Science in Medicine, and his theme one that he had adorned on more than one occasion. I shall not seek to challenge comparison with it; but, since the art and science of medicine presuppose the existence and activities of artists and scientists in medicine, let me for a few moments, with such knowledge and sympathy as I can command, consider that particular category of artists and scientists in medicine upon whose shoulders rests the burden—the privilege if you will—of training the medical student.

ORDER AND CHANGE

In the world of the teaching hospital and its school, a little world perhaps, but one that grows very dear to those who like myself have moved in it for more than half a lifetime, teacher and student each occupies his appointed place in that educational plan which is so inadequately subsumed under the title of the curriculum.

Over twenty-five years on the active staffs of both undergraduate and postgraduate schools have given me a healthy respect for all three—teacher, student, and curriculum—but equally have left me with few illusions about any of them. For there are times when one's fellow teachers can seem very tiresome, one's students incredibly dumb, and the curriculum a colossal folly. All three, indeed, have come under the heavy fire of criticism in our day, but we must in justice allow that all three have emerged with no mean credit from the major ordeals of our generation.

It is so easy to be critical, particularly of the past; and most easy of course for those who are muddling the present and mortgaging the future. Yet, if the achievements of medicine in our time have been remarkable, as we may fairly claim, then the methods and principles of our predecessors in the teaching of medicine cannot have been altogether futile or misguided. For let us not forget that it is standing on the shoulders of our forbears that we view the fair perspectives of advance that open before us. We are the inheritors of their long and devoted fostering of medical knowledge, and of that academic and practical freedom that they have won for us: freedom we shall do well if we hand on intact to those who follow us.

Of late years medical education has been the theme of long, ardent, and learned debate, and it is not necessary within these walls to recall the major contributions thereto made in their so different fashions by Wilfred Trotter and Thomas Lewis. I am not going to inflict a further chapter of this long and seemingly unending serial story upon you but to sketch in brief outline what I picture as the character and outlook of the ideal teacher of medicine in any adequate scheme of medical education.

I have acknowledged the great debt we owe to our predecessors and have submitted that their labours were not without merit, but this should not be taken to imply that their methods or outlook are incapable of betterment, or are adequate to our educational responsibilities today.

Progress necessarily involves change—orderly change. Indeed it has been said that "the art of progress is to preserve order amid change, and to preserve change amid order." For by itself order is not sufficient, and if it is not to degenerate into mere dead repetition it must be continuously infused by novelty. This orderly infusion is progress.

It is because this is so that there is always something interesting to be said about medical education, and it is in the spirit of readiness to accept change, where it is an orderly evolution from what is and has been, that I approach my subject.

WHAT KIND OF DOCTORS?

I know of no better definition of the objects of a teaching hospital than Nathaniel Faxon's, which Professor Himsworth recently brought to my notice—namely, "to advance knowledge, to train doctors, and to set an example of practice." This is no mere abstract proposition, but one that states in unequivocal terms what must be the activities of the teacher and what his purpose.

Of these three items I propose to consider the second one first—namely, "to train doctors." In the words "to train doctors" the one calling first for definition is "doctors," for until we have agreed what these are and should be we can hardly discuss their training.

What a rich and varied pattern of activities the word brings before our minds today: general practitioners, doctors in industry, in the civil, armed, and colonial services of the Crown, medical officers of health, bacteriologists, pathologists, specialists of every variety, medical and surgical, neurologists, and administrators—from the sublime to the less obviously sublime.

How, we may ask, are we to find a common plan of education to meet the needs of so diverse a collection of specialists and experts? Various solutions have been offered to us. Some would solve the problem for us in a sequence of what they would call self-evident propositions—namely, that most doctors become general practitioners, that the general practitioner is the backbone of the profession, and therefore that the scheme of training should be so designed as to concentrate upon his mass-production, leaving all else to postgraduate studies. But those who have done their anatomy will not need to be reminded that there is no more forlorn object of study, no more aimless piece of humanity, than the isolated backbone.

A balanced medical profession must contain every necessary kind of doctor. I shall not embark therefore upon a fruitless discussion as to which field of medical activity is best or most essential. The diversity we now see, a diversity which has very considerably reduced the proportion of general practitioners in the total body of qualified medical men and women, is the natural growth of two factors: the increase and differentiation of relevant knowledge, and the corresponding increase and diversity in the fields of usefulness of the doctor. Therefore, to argue that the general practitioner is more or less important than any other kind of doctor is as futile as to debate whether the comma is more or less useful and important than the semicolon.

Surely, what we need is a common educational plan providing a basis from which all the different specialists we need may ultimately most readily emerge. We must have a less rigid formula than that of a scheme concentrating exclusively upon the training of the general practitioner as we have seen him in the past.

My proposition is then that we need a plan of teaching and a body of teachers of medicine that will best allow the student to develop his bent and find that field of activity best suited to his gifts. For surely it is obvious that no-one really knows, when he embarks upon the study of medicine, to what branch of medical work he is going to feel called, what particular line of study and activity is going to stir his imagination and stimulate his energies.

I had been a medical student for four years before I knew what I wanted to do with my life, and my course

* Opening address of the session of the Medical School, University College Hospital, on Sept. 30, 1947.

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was determined when, in 1907, I opened the pages of Sherrington's *Integrative Action of the Nervous System*, which Professor Bayliss had put into my hands. This book, one that later ages will, I firmly believe, acclaim as one of the few imperishable books in the history of medicine and physiology, was no part of the curriculum of the day; and, had my teachers taken the narrow view that nothing should be imparted to me but what was of proven value to the general practitioner as he was then known, I might well have missed one of the most exciting mental experiences of my life, and one which more than any other has coloured and rendered so satisfying to me my years of neurology.

I ask your pardon for this brief lapse into autobiography—an exercise for which by modern standards I am far too old—but one's experiences are all that one has to offer of one's own, and I choose this one to make my point against any narrowly designed "utility" scheme of training for doctors of the future.

THE TEACHER'S TASK

Now I have promised not to harass you with discussion of the curriculum, but some general ideas as to what is asked of the teacher of medicine must be framed and expressed.

In seeking to do this I cover ground already trodden by Trotter and by Lewis, and can scarcely hope to avoid being an inadequate plagiarist. In brief, the student has to learn certain practical arts, to acquire certain techniques of applied science, to gain familiarity—by handling it—with his material, the human subject well and ill; and to acquire, if he is able, that intuition of reality which in the difficult problems of diagnosis and prognosis will enable him to choose, and to choose correctly, as often as is humanly possible the interpretation to place upon the scattered and incomplete clues that nature may provide. All this comprises what has been called his vocational training.

Knitting all this together and making of it as near an approach to coherent and orderly knowledge as is possible, the student also needs some general ideas and some fundamental definitions. The importance of the latter in logical thought in any field of endeavour cannot be over-emphasised. For example, what confusion we observe in medicine between what is abstract and what concrete, what is an idea and what an event or a thing! Thus, how many of us make it clear to our students that what we speak of as a "disease" is not something concrete that doctors discover, as Columbus discovered America, but is a general notion about like illnesses in different persons? In nature we do not encounter diseases, but only sick persons. Within the covers of a book, which has the depressing title *Influenza*, published some twenty-five years ago in London, there is an illuminating essay, entitled Method and Thought, by the late Dr. F. G. Crookshank, a former student of this school, in which this confusing business of thoughts, words, and things is faithfully and clearly expounded. I earnestly commend its reading to every student whose aspirations rise above a successful and enjoyable trip to that soft-currency area in Queen Square where sits the Conjoint Board.

In the matter of general ideas, too, the student must be given some knowledge of those general laws exemplified by the main modes of functional and structural reaction in disease, as these are seen in symptoms and in objective signs.

Finally, surely it is an ideal always to be aimed at, if but seldom realised, that we should seek to impart to the student a desire—a passion if possible—for understanding what he sees, a desire to know, as far as it may be known, the nature of the phenomena that come under his observation. For it is out of this desire to understand, and from it alone, that can be born the urge to add to knowledge, to break new ground.

EXAMPLE OF PRACTICE

So much for the training of the doctor. We come now to another of Faxon's objects: "to set an example of practice." I take this to include the demonstration in action before the student of the application of what he has learned of art and of applied science—in short, the use of judgment and that careful and experienced balancing of probabilities that is at the root of good medical practice. I should wish it also to include that humane outlook on the doctor-patient relationship that bids the doctor respect human personality, and seek to understand it. I have never believed that these things can be taught by precept, nor by hours spent listening to lecturers descanting upon normal and abnormal psychology. These may, indeed, provide some framework of ideas, but no more. It is only in our path through life and in the hard school of experience that this most difficult aspect of medicine can be mastered. There are also ethical aspects of practice that I should include under this heading of Faxon's.

To what ignoble tasks we may today be asked to turn our skills, the medical and lay press leaves us in no doubt: that macabre horror of the sickroom miscalled euthanasia; and the still more repellent business of artificial insemination employing the anonymous donor. What in his depravity the body-snatcher was to the teaching of anatomy a century ago, so today in medicine is that furtive and loathsome creature, the anonymous semen donor, whom some of our profession have called into existence; a fitting symbol of the disintegration of Christian civilisation.

It is not without reason, therefore—though, I fear, too late—that I make a plea for the place of ethics in this matter of setting an example of practice.

ADVANCEMENT OF KNOWLEDGE

Finally, and to relieve my listeners from that acute embarrassment and discomfort that any mention of ethical sanctions now evokes, let me return to the first of Faxon's postulates—namely, the advancement of knowledge.

No-one will dispute that this must occupy a primary place in the activities of any school of medicine, if it is not to degenerate into a sort of medical polytechnic. Stated in this way the issue is simple, but the advancement of knowledge implies the presence of research, and there are few words around which more misconceptions have arisen than this.

In the first place its definition has been somewhat blurred by the halo of sentiment some of its devotees have sought to place round it, as though it had some special esoteric quality that no other mode of human activity possessed; almost, indeed, as though it were the analogue, in the world of secular activity, of the contemplative life in the world of spiritual activity.

Again, it has come increasingly to be associated in our minds with highly organised team activity, often subsidised by large organisations which command vast budgets. What in the world of commerce is pathetically called the "small man" has his opposite number in that of medicine and science, but we hear less and less about him, for in any medical school or research institute he has been crowded out by the large departments; and, however brightly there may burn in his soul the urge to add to knowledge, he will find it hard, if not impossible, to get a foothold unless he joins "the big unions."

No-one will deny the intellectual gifts demanded by first-class research, or the necessity in medical as in other fields of organised large-scale investigation. Let us not however fall into the vulgar error of supposing that only vast organisations can conduct research, that only the rare genius can add to knowledge, and that the independent worker in whom the impulse to do original research is present cannot labour fruitfully in this field. Discoverers of genius are as rare as poets or painters of

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genius, but this has never deterred the man with the spark in him from fulfilling himself in verse or on canvas.

I believe the truth is that in medicine most men of keen intelligence do feel the craving for some adventures of thought, the urge to pass the frontiers of the known and established, and beyond them to chart at least some small regions of the unknown, and to throw the light of reasoned curiosity upon some dark corner of human ignorance.

Anyone who puts his observations together to exemplify from them some law of nature, to detect some persistent pattern or some ordered recurrence in events, is doing research and seeking to advance knowledge. It is in fact to those who work in clinical medicine in this spirit that nature gives the opportunities of new knowledge, by virtue of their intellectual vigilance and preparedness to discern in the stream of experiences the significant phenomena and events as these float by.

I submit, therefore, that some infusion of this reasoned curiosity, some interest in the relation of stubborn facts to general principles, is a vital element in the endowment of the true teacher of medicine.

Let us not shrink from the conclusion to which this submission, if we accept it, must lead us. It implies that the teacher who has not at some time and instinctively, as it were, sought to make some contribution to knowledge lacks the divine spark and cannot therefore kindle it in his students. Insensibly and inevitably he risks the descent from the status of educator to that of the instructor in techniques.

Looking back over forty years to my own teachers in this hospital and school, they fall naturally in my recollection into two categories: those who forced me to think and gave me something to think about, over and above the factual knowledge they communicated; and those who gave me facts alone. I am grateful to both, for both were inspired to give the best of what they had, and they gave it generously and graciously; but I know too who it was that influenced me most, who gave me the spirit of emulation and the deep desire to place some small offering, however modest, upon the altar of knowledge as I passed by. Such a man was John Rose Bradford. Wilfred Trotter was another, and it was impossible not to be aware of, or not to be stimulated by, their intellectual distinction. There were others, too, to whom the debt of my generation in this hospital was great; all were alike in that they were men who in their time had broken new ground in medicine and left it richer than it had been before their day.

The spirit of inquiry, therefore, is *the* vitalising element in the life of a medical school. It can flow only from the teachers; and whether these are academic teachers engaged in large-scale organised experiment, or independent workers following their problems as opportunity allows, and perhaps also engaging in the private practice of medicine, does not seem to me to matter greatly. *It is the spirit that counts*, the interest in new observation, the capacity for the steady contemplation of facts, the gift of generalising from them, and an unwillingness to puff pompously and incuriously through life along the permanent way of established arts and techniques.

THE TEACHERS

This brings me to my last consideration. An antithesis has been made, in discussion on medical education, between theoretical and vocational teaching. That this is a real distinction in thought and in the method of teaching is apparent. Yet how disastrous it would prove if teachers were to allow themselves to lapse into one or other category of teaching exclusively; if, for example, the teacher of the practical arts and techniques were to content himself with this and felt no obligation to penetrate to fundamentals, to view medicine philosophically or as a body of knowledge in which coherence was to be sought; or, on the other hand, if the teacher of theoretical medicine lived in a world of principles and of abstract ideas about disease and ceased to be actively interested in practical arts and techniques, in the intellectual aptitudes developed by diagnosis and prognosis in individual cases, or in the humane side of medicine in which the doctor faces and seeks to understand the personality and the human needs of his patient.

Thomas Lewis clearly foresaw such a danger and warned against it; but it is clear that the presence in the modern medical school of two categories of teacher, the practising consultant and the salaried academic teacher, opens the door to this disastrous dichotomy. The practising teacher is familiar in his everyday work with the individual seen against the backgrounds of his home, his family, and his work. The full tide of human needs and distresses bears down daily upon him, and the arts and techniques of medicine are his constant and exhausting preoccupation. He may cease to look beyond them.

For the cloistered academic teacher life is different. He gets his patients washed and tidied and laid out in rows in hospital wards; their importunate and exacting wives and mothers-in-law do not intrude upon his profound cogitations. No unpleasant smells or noises break in on his ordered eloquence; house-physicians and nurses wait on his bidding and tremble at his voice, and all those seeming irrelevances that are so necessary to the balanced comprehension of the patient's total situation are carefully tidied away out of his sight. He does not miss them, for he has never known them. He is rather like the florist who can arrange the plucked blooms, from which the dead leaves and the dirty roots have been removed and the earwigs shaken off, into all the combinations of form and colour his fancy dictates.

I feel sure our clinical professors will greet this simple and faithful picture of their austere lives with sentiments of happy recognition.

The practising teacher, on the other hand, is the toil-worn gardener, who has to bend his proud back and soil his hands; but his reward is that he does know the plant as a structural and functional unity, and knows too something of the soil and the floral community in which it has grown and lived. Would it be surprising, therefore, if the former became the somwhat dryly theoretical teacher and the latter a rather pedestrian vocationalist?

We dare not, therefore, separate these two aspects of teaching. Each one of us must seek to be the artist, the man of science, and the humanist of Trotter's imagination and of his example.

Finally, it is not amiss to say that every teacher is the better for knowing how to teach. Oddly enough, the university grade of teacher receives no training in the pedagogic art and has to teach by the light, often intermittent and smoky, of nature.

CONCLUSION

You have listened very patiently while I have been building castles in Spain; you have had to bear with the painful reality depicting the unattained ideal. The cynics among you, however, and they must be many in this disillusioned age, must have found some satisfaction in the sad contrast, and therefore I need not apologise.

But my situation also has not been without its charms; for, as my argument has rocked to and fro, somewhat alarmingly at times I fear, swaying now to one point of view and now to another and contrary one, I have had the opportunity of noting the play of conflicting emotions in the more informed and critical of my audience. But I have sought to give everyone the satisfaction, and I know of few greater, of hearing something from which he could heartily and angrily dissent, and I trust something also to which he could scarcely refuse to agree. What could be fairer or more exasperating?

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Yet behind the angularities and imperfections of my address there does rest with me the profound conviction that the responsibilities of the teacher of medicine have never been heavier than now, nor his opportunities greater; and each of us must bear constantly in mind that it is his individual duty to advance knowledge, to set an example of practice, and so to train doctors that there will always be among our pupils those whom we have inspired and fitted to bring these ideals nearer to realisation than we have done.

Let there be no mistake; if we accept narrower aims than these, our medical schools will sink to the dead level of polytechnics, and the torch of living and growing medicine will pass from our hands to separate research institutes, to which all that is best in the coming generation of potential teachers and investigators will turn, and the prestige of the medical school and teaching hospital as we have known them will have departed for ever.

PERSONALITY CHANGE AFTER PREFRONTAL LEUCOTOMY

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CRICHTON ROYAL, DUMFRIES

REPORTING on the immediate results of prefrontal leucotomy performed in Crichton Royal, Berliner et al. (1945) and Moore (1946) pointed out that closer studies of the postoperative personality changes would be necessary, especially before leucotomy could be recommended in recent mental illness. The same was suggested by the Board of Control (1946) in a pamphlet which surveys 1000 cases operated on in British hospitals up to 1945. This number shows to what extent the treatment has been applied and no doubt is still being applied in this country. About a third of the patients collected in the pamphlet have been discharged from hospital, but little has so far been published about their lives in the family and community; follow-up studies are obviously needed.

An ideal study of this kind should assess the patient's prepsychotic personality, follow the changes due to his illness up to the operation, and compare them with the postoperative changes. Since improvement may take place as late as two years after the operation, the follow-up should cover at least two years. Even necropsy findings should be included, in view of the different positions of the cut in the brain reported by Meyer and Beck (1945).

In the present investigation the patients who responded most successfully to the treatment—i.e., those who were discharged to their homes—were specially studied. The disadvantage of the relatively small numbers of cases available from one hospital is counterbalanced by selection and diagnosis by the same team of physicians, standard operative procedure and postoperative treatment, rehabilitation in the same surroundings, and discharge according to the same principles.

MATERIAL

Of the first 170 patients operated on between February, 1943, and June, 1946, 77 were discharged from hospital; 9 had to be readmitted after being at home from two to twenty months. The remaining 68 patients were 28 men and 40 women. In our total of operated patients the number of males and females was almost equal. The sex-distribution is at variance with the larger material of the Board of Control (1946), which shows a higher proportion of men successfully treated; but one would expect women to be taken out of hospital more easily than men after a long illness. Of our patients 14 had lived at home more than two years, 28 between one and two years, and 26 less than a year.

Three-quarters of the cases were long-standing schizophrenia of the catatonic and paranoid types; 9 were obsessional neurosis, 7 melancholia, and one recurrent mania; 9 patients had been ill less than three years, the remainder longer; 18 had been ill more than ten years.

In cases with a duration of illness less than three years the less drastic methods of treatment, including electrically induced convulsions and insulin coma, had been tried without success, and there was no reasonable hope of spontaneous remission. Before the operation 45 patients had been in hospital from one to five years, and 12 for more than five years; 11 patients were operated on within the first year of their stay in hospital, but they had been invalids at home for many years. The length of stay in hospital after leucotomy was three months in 7 cases, from three to nine months in 51, and over nine months in 10.

METHOD

Since the patients came from all parts of the British Isles, a personal follow-up of all cases was impracticable; but many discharged patients and their relations continued to correspond with us. We therefore attempted a follow-up by letter, well aware of the shortcomings of this method. We saw 8 patients personally; this group served to check the information obtained from the letters. They were either within easy reach for an interview or visited the hospital from time to time, thus providing an almost complete picture of their progress. They were representative of the whole series as regards diagnosis (6 cases of schizophrenia, 1 of melancholia, and 1 of obsessional illness) and as regards the length of time since discharge.

In view of the suggestibility of any lay person on the efficacy of medical treatment and cure, we did not use a questionnaire but sent a letter of general inquiry. The questions dealt only with the patient's prevailing mood, his occupation, and social behaviour. The letter was first addressed to the patients; later a similar letter was sent to the relations.

The method used for assessing the replies was developed by Mr. J. Raven, director of psychological research at the hospital. After the replies had been classified according to whether they were patients' or relations' descriptions each statement was tabulated in such a way that the frequency of any item could be read vertically, while a horizontal reading gave a brief picture of each patient. The drawback is that the table only gives the frequency of the statements, which is not necessarily the same as that of the items mentioned. The method therefore resembles more that of a historian reconstructing a past age from contemporary letters than that of an observer counting facts.

RESULTS

Nearly all the patients replied; no patient seemed to resent the inquiry. In a few cases the relations withheld our letter from the patient, being afraid of reminding him of the operation. Most patients' letters were short and simple, some even childish in style, though most of the patients had been well educated and accustomed to writing. The simplicity of the patients' letters was striking when compared with the full and elaborate descriptions received from their relations. How complete was this written information from the relations is shown by the fact that, when the letters were compared with the results obtained by interviewing the patients, there was conformity on all important points.

Work and Occupation

The working capacity of these patients, who without operation would have been chronic invalids, is shown in the accompanying table. Among the professions (P) were 1 lecturer, 3 teachers, 2 nurses, and 1 barrister, the last now living in retirement. The business group (B) included independent owners of businesses as well as

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commercial travellers and salesmen. They responded less well than the professions and the housewives (H), who showed by far the best results. Clerical workers (C) included secretaries, typists, &c., mainly young women. Among the skilled workers (S) were 3 mechanics, 1 miner, 1 joiner, 1 tailor, 1 shepherd, and 1 foreman on a farm. As unskilled (US) we listed domestic and factory workers,

NUMBERS OF PATIENTS IN DIFFERENT OCCUPATIONS BEFORE ILLNESS AND AT FOLLOW-UP

Before illness	At follow-up										
	P	B	H	C	S	US	T	R	SO	U	I
P 7	6	..	..	..	..	..	..	1	..	..	..
B 10	..	3	..	..	..	1	..	1	3	..	2
H 12	..	..	10	..	..	..	..	..	1	..	1
C 10	..	..	..	3	..	..	..	..	2	3	2
S 8	..	..	..	..	4	..	..	..	2	1	1
US 11	..	..	..	..	..	6	1	..	2	1	1
T 10	..	..	..	..	1	2	2	..	4	..	1
Total 68	6	3	10	3	5	9	3	2	14	5	8

shop assistants, message boys, &c. Students, schoolchildren, and apprentices were included in the training group (T); 2 of these continue their studies, 2 work as domestic and labourer, 1 as secretary, and 4 are in sheltered occupations (SO)—i.e., working on the farm or in the house or business of their relations, assisting but not in a capacity justifying the award of a regular wage. Unemployed (U) refers to temporary unemployment after the patient had taken up work after discharge from hospital. Those classified as idle (I) had never attempted to work regularly. Among this group we found 7 patients who should be readmitted to hospital.

More than half the patients could earn their living, and more than three-quarters were usefully employed. More than half the patients had the same occupations as before their illness, or similar ones, the other half having gone down on the occupational scale. In view of the length of their illness and of their absence from home and the labour market, and the relatively young age of some at the outset of their illness, these figures are very satisfactory.

We also found that there was a greater tendency to deterioration, as regards occupation, in the schizophrenics than in the non-schizophrenics, which is what one would expect.

Of 31 statements made by relations about the quality of the patient's work 18 said they worked well, 11 described the work as poor or deteriorated, and 2 mentioned recent improvement. On the other hand, 9 out of 10 patients emphasised how well they worked, and none said that they found it difficult to take up work again. Some patients lacked judgment about their abilities, and it is reasonable to suspect that professional standards were often reduced or lost, as the following examples suggest:

A patient described himself as a salesman and supervisor in his father's firm, but his father wrote: "I am sorry he has not found a useful occupation yet; being the son of the director he wanted to be appointed to a managerial post which he cannot possibly undertake. He travels to the city about three days weekly and is helping in the business for about an hour, when he will go off for coffee, return for a little while, and go for lunch, returning usually to his home in the early afternoon."

Another patient worked as a finisher in a dress factory. Her employer reported: "Her work is most unsatisfactory, slow, and inaccurate. Whenever a remark is made on this account, she is most offensive and will say 'You can dismiss me if you don't like it.' She is most uncritical towards her achievements and does not try to do better."

Employer's report on a librarian-secretary: "Patient was dismissed because she was considered incapable of doing her job. The informant would show patient how to do a certain job. She might do this correctly once or twice, but would then lapse back into her own way of doing it and forget all the things he had told her. Informant added that she thought she knew all there was to know about library work. She would not be taught. She was always perfectly satisfied with what she had done and never asked for help."

In 8 cases we heard about the patients' initial difficulty in being in time for work and appointments but also that this difficulty, prominent in the first year, had disappeared later.

In 7 cases the relations complained about lack of discrimination in money matters: "She denies herself over pennies, giving generous presents or taking expensive holidays. . . ."; "Before, the patient would say 'We can't really afford that.' He never has said so since the operation." On the other hand, the majority seemed to manage their money matters well. Even when gambling and betting were mentioned, they were done only on a small scale.

An interesting feature is the frequent change of jobs: 11 patients had had more than two jobs, some up to five, since their discharge. This may be partially due to dismissal because of inefficiency, but the patients did not take this view:

A motor mechanic wrote a year after leaving hospital: "I have got on well since I left. I have been doing nursery work and find it interesting. Before this I worked as a gardener at a hospital here, as a mechanic, also as a sheet-metal worker under a friend of mine, and as a farm labourer."

One is inclined to blame the restlessness apparent in other fields of behaviour for some of these changes. This is supported by the frequency with which younger patients wrote of plans to emigrate.

Interests and Hobbies

In their hobbies and interests we found signs of the same restlessness. Of 18 patients 17 reported that their interests were the same as before their illness, but 10 of 22 relations reported that the patient's interest had changed. Most remarkable, however, were the diversity and multiplicity of hobbies and interests in one patient:

"I still have my large flights full of birds. I have 40 canaries, also budgerigars and British birds. I keep them mostly for shows. Also I read a lot of books. I have my four hives of bees to look after as well. And I still have my music practice, as I have played a piano accordion for three years now."

To this list his sister added:

"He has many hobbies, wireless. . . . He also has a few ducks which he hopes to sell at Christmas. He goes to the picture hall, also goes two or sometimes three nights a week to play darts and dominoes from eight to ten. He likes country walks too and takes our dog for a stroll every evening. As soon as he is finished at the shop and had his tea he is away into his tool-shed doing all kinds of jobs."

This is perhaps an extreme case, but many of the same sort could be quoted from our material.

Most of the patients preferred sports and light entertainment. Outings of various sorts were in great favour, 18 relations and 16 patients reporting that they "enjoy going places."

"She is taking dancing-lessons, practises the piano every day, embroiders her Christmas presents, goes to celebrity concerts, and is determined, as she says, 'not to miss anything.' She keeps an engagement book, as she does not want her dates to clash."

It is probably not accidental that sports and light entertainment played such a large part in the letters of relations and patients, many of whom had formerly serious interests in art, literature, religion, or politics. One patient wrote:

"A great many strong opinions that I used to have seem to have disappeared altogether. I had, in spite of certain

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intelligent doubts, great religious faith, but now I seem to have no enthusiasm for any kind of religion."

Similar observations were reported by Hutton (1947).

Where old interests were kept up there were sometimes signs of a lowering of standards in taste or cultural level: "His former love for music has not returned." Poetry was hardly mentioned; reading mainly referred to factual matters. A mother wrote: "She is not yet able to read the heavier type of books she used to read." On the other hand, one of our younger patients showed a remarkable talent for original drawing which, according to her mother's letter, was well maintained after the operation; she continued to attend the art school with much zeal.

Social Life

In contrast to the reserve and withdrawal during the illness, the patients, after operation, took a definite part in the social life of the community: 22 relations' and 11 patients' letters mentioned that they were sociable. Many were described as popular, taking part in all social events, helping in clubs and societies, being friendly with everybody, and liking to entertain. Social activity seemed often to be an outlet for the patient's restless drive.

"She had a party the other evening and entertained her friends. She played the piano, played duets, games, &c., and it reminded me of similar evenings many years ago. Maud's friends think that a miracle has happened. She is like the person she was before she became ill—except that she is a much happier edition. A favourite phrase is 'I laughed and laughed' as she relates some joke."

"He takes part in all the social events in the neighbourhood, goes to dances, to the cinema, whist drives, or invites people to the house for cards. He has won quite a number of prizes at whist drives and also puts small sums of money on horses."

On the other hand, individual personal friendship was hardly mentioned in the letters. When we put this question to the interviewed patients and their relations, we received rather characteristic answers: "She has not made any new friends"; "Nobody would be bothered with her"; "Nobody would make a pal of her, she considers herself first always"; "She is not a person you could either like or dislike. She is completely colourless"; "There is a kind of vacancy about her."

Family Life

Shortcomings of this kind would be expected to be more obvious in the family life of our former patients: 48 letters commented on the patients' behaviour towards their relations, all patients contending that they got on very well. However, 10 out of 29 relations found it difficult to live with the patient. Three main reasons were given for this difficulty: (1) shallowness of feeling and lack of affection and of consideration for others, even for children; (2) domineering manner, self-willed stubbornness, and inaccessibility to reason; and (3) outbursts of temper and irritability.

Lack of affection was especially distressing to people who had shown the utmost consideration for the patient returning after a long absence. They found that the patient accepted it without any appreciation as a matter of course. Wives and children felt the emotional estrangement and indifference, and suffered under it.

"He is not like his old self; for instance he does not take the interest he should in our little girl, aged 3 years. He doesn't play with her like other fathers."

"He seems very shallow in his feelings and incapable of affection. He cares for no-one but himself."

"Kitty, our daughter, greeted her mother's return with enthusiasm; but, so far as I could see, her mother eventually killed Kitty's enthusiasm for her companionship. After spending the Easter holidays with her, Kitty wrote to her house-mistress asking for permission to return to school a day earlier with the new girls and wrote that she had never been so miserable in her life."

Stubbornness and inability to see another's point were considered by some relations to be a return to the patient's behaviour in adolescence; by others a completely new trait:

"She used to be quite the opposite."

"Her domineering manner, maintenance of her own opinion, &c., make her a difficult person to get on with. One got the impression that the domineering and difficult character of her youth was accentuated."

"She was always adventurous, difficult to advise, and somewhat self-willed. Now she is quite unaware of obstacles to what she wants to do . . . they don't exist, and her mind is completely closed to advice or suggestion; she speaks of such advice in an impersonal way, as if it does not connect itself in her mind with her actions."

"There is one thing, she is never repentant in any way when she has done any wrong."

"Everything she says and does is right in her own mind. Always it is my daughter and I that are in the wrong."

Outbursts of temper were the least disturbing, because the 13 letters recording it also noted how short-lived they were. Irritable excited scenes "seem to pass immediately, and she is at once as though nothing unusual had occurred." Improvement of irritable reactions with the passing of time since the operation was mentioned in several letters:

"I was apt, after my return home, to allow my temper to get the better of me."

"He sometimes loses his temper over a mere trifle (not often) and gets excited, but I notice if I take no heed of him it passes over soon, in a few seconds, maybe; he is not bad-tempered afterwards, but his usual self again."

The changed emotional behaviour was, however, not always considered disturbing in the family group. Some relations saw its positive value: 15 wrote that the patient never worried, not even in grave situations.

"Obstacles seem not to exist if he wants something, and he takes good care that he gets it. Everything he does is right in his own mind; he is never repentant nor shows signs of regret."

"She never in the past worried much, but now she is definitely free from any worry. This is the most marked difference in her condition. In fact, occurrences or possibilities which would be expected to alarm her hardly appear to affect her at all. For instance, early this year my daughter caught anterior poliomyelitis, but I do not think my wife realised the danger."

"The patient is so far from worrying that he seems to treat without much gravity really serious circumstances. He behaved with his usual calm during a rather unpleasant miscarriage I had in the spring, and attended his badminton club, the cinema, and a fishing excursion just as usual."

Sex and Married Life

After leucotomy there was little indication of irresponsible behaviour among our cases. This is remarkable in view of their relatively young age, 26 being under thirty and 20 under forty at the time of discharge. Three-quarters of our patients were single—24 men and 27 women. In 1 man only was excessive sexual indulgence reported. This being an entirely new trait, it greatly shocked his respectable family. In none of the unmarried women was there any evidence of sexual promiscuity; 2 men were reported to be considering marriage; 1 had married much against the desire of his family. Of the 2 married women under forty-five in our material one was expecting a child. The wives of 2 of the 4 married men had become pregnant since the patient's return home, one of them for the second time.

Finally, there was no report of any serious conflict with law and order. This important negative finding, together with the restraint in sexual matters, may be a

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reflection of the moral standards of the middle-class group from which our patients were drawn, and of the constant care they received in their homes after discharge.

Physiognomy

A changed physiognomy was often reported. This referred not only to the common increase in weight or to greater care in dress, &c., but also to a greater freedom in demeanour and bearing. The patients emphasised their feeling of good health and well-being, their splendid appetite, and their sound sleep. Only 1 patient complained of insomnia. The ravenous appetite slowly subsided in time; none of our patients discharged for more than a year showed this symptom. Similarly the excess in weight disappeared after some months or years.

Mood

Most striking to the eye, and reported in 63 letters, were the patient's visible happiness and all-pervading cheerfulness:

"Her outstanding qualities now are her gaiety of spirits, her energy and love of life."

"She has been happier and more contented than I have known her for the last twenty years."

"I find after all the world a nice place to be in."

Only in 2 cases did we hear that the patient was temporarily unhappy.

The patients had no doubt about their success in life after their return home. Increased self-esteem and lack of self-criticism were only too obvious both in letters and in interviews. They cared little for what others thought or said and were convinced that what they did was right. One can easily realise that the people round them tended to minimise or even to suppress less pleasant features, seeing the patient so happy and pleased with himself.

COMMENT

From these data it is possible to sketch the character of a patient after leucotomy.

The patient is physically healthy, a good eater and sleeper, with considerable euphoria. His prevailing mood is cheerfulness; he does not worry, is happy and contented, and shows it. He has a high opinion of himself and his abilities. He may take his responsibilities too easily or may shirk them altogether. He leads an active life, is restless, and likes movement and change. His interests and hobbies are varied and variable, with a preference for light entertainment and superficial pastimes. He is easy-going, a good mixer, and fond of social life and of being on good terms with everybody.

On the other hand, his relations with the people round him are often without depth of feeling. He shows little sympathy or consideration for his next of kin or anybody else. He neither regrets nor repents for whatever he may have done or said. He may be self-willed, headstrong, and unable to see the other person's point of view. He tends to quickly passing outbursts of temper. He may attend to his work as before or may do less well, but he invariably thinks he does well; he is not a perfectionist.

This picture is, in any particular case, modifiable by special features traceable to the personality before operation. Positive symptoms of the former psychosis, delusions, hallucinations, obsessional ideas, and rituals were mentioned in some letters but seemed on the whole to be insignificant. Of the 14 letters mentioning persisting symptoms 8 were from obsessionals and their relations. In almost every instance the number of obsessions and rituals had diminished. Guilt feelings and anxiety had disappeared. The obsessional ideas had lost their predominant influence on the patient's behaviour.

It may be objected that hyperactivity, shallowness of affect, impulsiveness, and lack of judgment are symptoms of the schizophrenic illness from which three-quarters of our patients suffered, and that even if they exist as a background to the cheerful, outgoing, and sociable personality as described—which is certainly not schizophrenic—they are nevertheless remaining symptoms of the illness. A comparison of the frequency of these traits in schizophrenics and non-schizophrenics shows that the 17 manic-depressive and obsessional patients contributed in the same proportion as the schizophrenics to these traits as they did to all the principal features from which the composite picture was developed.

DISCUSSION

In clinical terms the main features of this composite picture are symptoms of frontal-lobe damage after head injury (Feuchtwanger 1923) or lobectomy for tumour (Rylander 1939) in man, and after experimental removal of the area in primates (Fulton 1943). In the emotional field are euphoria, fatuous equanimity, absence of finer emotional response, rudeness, and tactlessness. In the motor field are hyperkinesis, restlessness, and distractibility. In thinking there are turning towards the "concrete" (Goldstein and Scheerer 1941), impairment of "synthesis" (Brickner 1936), and lack of insight (Guttmann 1931). These symptoms may be much milder after leucotomy than after gross cerebral injuries; but the difference is only one of degree. Immediately after the operation we find other frontal deficiency signs—ravenous appetite, disturbance of memory and retention, apathy and laziness, irritability, and lack of emotional inhibition; symptoms which seem to disappear in time and under proper rehabilitation.

From this analogy it follows, and is suggested as a theory of the treatment, that the operation, if successful, provides the patient with a new framework of personality caused by the isolation of his prefrontal areas. If the post-leucotomy patient's mental life has to be reconstructed within a new framework, one can hardly expect this to be accomplished in a few weeks or months. In 31 letters it was mentioned spontaneously that the patients were still improving, some of them two years after the operation. Neurosurgeons know of the slowness of adaptation when larger parts of the brain have had to be removed; one also remembers the time-consuming work of the head-injury institutes and special schools after the 1914–18 war in which penetrating injuries of the head were so common.

In the light of our theory the original prepsychotic personality should not have a decisive influence on the final result. Unfortunately our material does not allow a definite answer on this point. There was often only scanty information about the patient before his psychosis which had begun many years previously. But some of our patients who had been abnormal since adolescence have done unexpectedly well though they had not matured before illness to anything that could be called an adult personality.

The following practical conclusions can therefore be drawn.

(1) *Selection of Cases*

Hebephrenics showing only lack of initiative, affective blunting, and facetiousness are too akin to the frontal syndrome to permit any improvement after operation. After a few disappointing results, we, like many other workers, have given up considering the treatment in this kind of case.

In severe obsessional illness crippling the patient's life for years leucotomy seems the only way out of chronic invalidism and admission to hospital. Thus, 11 patients severely handicapped by their illness, some after years of unsuccessful psychotherapy, have been operated on and returned home or are ready for discharge.

In chronic affective psychoses periodicity has been abolished and more than three-quarters of the patients have recovered; but our number in this group is small.

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Our largest group, the schizophrenics, selected only by excluding hebephrenics, consists of catatonics, paranoids, and paraphrenics. The ability to lead a useful life outside hospital was restored in 30–40% of these cases. In this figure are included some patients who could be discharged but have no home to go to. In another 20–30% the most distressing symptoms have definitely improved. This is no small achievement in view of the years of misery, suffering, and struggling with delusional phantoms now spared the patient, and the general effect on the atmosphere of the hospital. Why the result of the operation is fully satisfactory in only a third of the cases cannot be answered from the small number of discharged patients. A parallel study devoted to those patients operated on in the same period and still in our hospital will provide a series for comparison.

(2) *Time of Operation*

Rebuilding of the personality on the new basis is always possible so long as one can be certain that emotional and intellectual life are preserved behind the screen of psychotic behaviour. Only expert observation will be able to judge this in long-standing cases of schizophrenic withdrawal and deterioration.

There is, on the other hand, no need for leucotomy in an early stage of the illness, except perhaps in quickly deteriorating "nuclear" schizophrenics not responding to insulin treatment. In all other cases not only should the usual less drastic therapies be tried first but also, in the event of their failure, the psychosis should be left to run its course as long as a spontaneous remission can be reasonably expected. Published figures, like those of Freeman and Watts (1946), give no proof that the results of workers who operate in early cases are much better than our own.

(3) *Operative Procedure*

If our theory is correct, the problem of the operation becomes one of quantities. The surgeon will be asked to produce enough frontal symptoms to combat the symptoms of the psychosis—enough euphoria against distress and depression; enough extraversion and distractibility against introspection and withdrawal; enough indifference and freedom from care and worry against obsessions, delusions, and fear. The dilemma obviously is between either producing too mild a frontal deficiency syndrome, with the consequence that the psychosis rules the patient's behaviour as before, or producing a too severe syndrome, with a resulting clinical picture as disturbing as the original illness.

It is less certain if these psychopathological quantities correspond to the amount of prefrontal lobe isolated by the operation. Perhaps isolation of certain parts of the area—e.g., the orbital region—is responsible for all (Hofstatter et al. 1945) or only some (Dax and Radley-Smith 1946) of the frontal symptoms. Perhaps the more or less complete severing of the thalamofrontal radiation represents the quantitative correlate to the clinical symptoms, a view strongly held by Freeman and Watts (1942), whose technique (incision in the plane of the coronal suture) was used in the present series of patients. From a personal communication of Dr. Freeman it seems that these workers now aim at the greatest possible completeness in the division of the white matter in this region. They also advocate a second operation 5–10 mm. behind the coronal suture in patients who do not recover from their psychosis after the first operation (Freeman and Watts 1946). All this, however, can be explained without reference to special bundles of fibres if we assume that the resulting mental change depends on the amount of prefrontal area isolated. Until the physiologist and pathologist can furnish more detailed information, this seems a reasonable working hypothesis.

(4) *Postoperative Treatment and Rehabilitation*

In the postoperative period the patient's life and personality are pliable and easy to mould, ready for a systematic reconstruction. They are accessible to psychological and occupational training, sometimes to sedation and other physical treatments, all of which were without avail before the operation. Re-education of the injured brain is a new task for the psychiatrist and for most psychiatric hospitals.

Without adequate facilities for reablement the operation should not be advised. Some details of the method used in this hospital were given by Berliner et al. (1945).

The result of our follow-up has strengthened the case for a prolonged convalescence in hospital before discharge should be considered. The patients, freed from their tribulations and worries, and their relations, impressed by the patients' happiness and cheerfulness, urge the physician to discharge him. Three months should be the minimum for re-education. Even then, only when the home environment is favourable should the patient be sent out on trial. Relations should be warned of the difficulties they will have to face and instructed how to continue re-education; the family doctor should be fully informed. There is no doubt that those who have been patiently and tactfully supervised by their friends at home have adapted best. On the other hand, most of our readmissions were due to lack of understanding and guidance in the home and to other adverse environmental factors.

SUMMARY

The results are reported of a follow-up of 68 patients discharged from hospital after prefrontal leucotomy out of a total of 170 patients operated on between February, 1943, and June, 1946. The patients had been at home for at least six months.

More than half these patients (a fifth of the total), who without the operation would have been hopeless chronic invalids, earn their living, and more than three-quarters are usefully employed.

Working capacity and the patient's attitude to work, interests and hobbies, social, family, and sex life, are described as well as personal appearance and prevailing mood.

From these findings a composite picture of the successfully treated patient after leucotomy was abstracted. Its prominent features are well-known symptoms observed after frontal-lobe damage due to trauma or neoplasm. After leucotomy these features provide a new framework of personality in which the patient's mental life has to be reconstructed.

In the light of this theory of the operation practical conclusions are drawn in regard to selection of cases, time of operation, operative procedure, postoperative treatment, and rehabilitation.

We are indebted to Dr. P. K. McCowan for permission to publish this material and for his advice, and to Mr. R. L. Beveridge, who operated on most of the patients. Our special thanks are due to Miss M. A. Lane, senior psychiatric social worker at the Maudsley Hospital, London, and to her students who followed up some of our patients in the London area.

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THERAPEUTIC ABORTION

BY MEANS OF SOFT-SOAP PASTES

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SEVERAL German writers in the 'thirties reported on the dangers of introducing soft-soap pastes into the uterus to terminate pregnancy. More recently Weilerstein (1944) in America has drawn attention to these dangers, adding that he understands that the method is ineffective in half the cases. On the other hand Döderlein, quoted by Riddell (1932), said that he had used such a paste on 35 occasions and had been more than satisfied with the results.

In this country attention has been drawn to this method by Browne (1946) and Barnes (1946). While in no way wishing to minimise its risks, I believe it to be useful when carried out under ideal surgical conditions by experienced gynæcologists.

The original pastes used on the Continent were named 'Interruptin' and 'Provocol.' Provocol contains, in slightly different proportions, the same ingredients as does the 'Aretus' paste, used at University College Hospital in 1939, which consists of olive oil 32%, cocoa butter 2·66%, caustic potash 4·8%, caustic soda 1·86%, thymol 0·07%, tincture of myrrh 2·66%, benzoic acid 1·33%, metallic iodine 0·66%, potassium iodide 2·0%, and distilled water 51·96%. The formula we now employ is: stearic acid 10%, arachis oil 20%, alkaline solution (consisting of potassium hydroxide 9·5 parts, sodium hydroxide 3·75 parts, and water to 100 parts) 20%, 'Lanette wax sx' 1·5%, chlorocresol 0·05%, and water to 100%. The paste is sterilised in the autoclave.

TECHNIQUE

The patient is admitted to hospital and prepared for a vaginal operation. Premedication with 'Omnopon' gr. $^1/_3$ and scopolamine gr. $^1/_{150}$ is given an hour before the operation.

The patient is taken to the theatre and placed in the lithotomy position. Anæsthesia is not needed. The vulva and vagina are cleaned with a solution of 'Dettol,' and sterile towels are applied. Bimanual examination is made to confirm diagnosis and to determine the position of the uterus. The cervix is exposed and grasped with a pair of sponge-holding forceps and again painted with dettol solution. The sterile paste, previously warmed to 100°F, is injected into the lower part of the uterine cavity using a 20 ml. syringe and a Forsdike's intra-uterine tube. The tube is inserted just through the internal os of the cervix, care being taken to avoid touching the vaginal walls with the tube during its introduction, and the paste is injected very slowly and without any force, about a minute being taken to inject each 5 ml. The tube is withdrawn, and the cervix is inspected to see that the paste does not return.

The amount of paste injected has varied with the operator and the duration of the pregnancy. As a working rule it is suggested that the amount should be 5 ml. plus 1 ml. for each week of pregnancy.

A few hours after the operation the patient is given 1 or 2 oz. of castor oil.

TABLE I—INDICATIONS FOR THE TERMINATION OF PREGNANCY

Indication	Duration of pregnancy (weeks)				Total no. of cases
	12 or less	13–16	17–20	More than 20	
Pulmonary lesions:					
Pulmonary tuberculosis	20	7	0	2	29
Bronchiectasis	0	0	0	1	1
Chronic bronchitis and asthma	0	0	0	1	1
Cardiac lesions:					
Valvular disease	5	9	0	1	15
Hypertension	0	1	0	0	1
Thyrotoxicosis	1	1	0	0	2
Psychiatric conditions:					
Mental instability	6	4	2	3	15
Renal lesions:					
Recent nephrectomy	1	0	0	0	1
Renal calculi	1	1	0	0	2
Chronic nephritis	0	1	0	0	1
Chronic pyelitis	1	0	0	0	1
Miscellaneous lesions:					
Recent radical mastectomy for carcinoma	1	0	0	0	1
Bilateral congenital dislocation of hips	1	0	0	0	1
Total	37	24	2	8	71

RESULTS

Table I shows that in the present series of 71 cases in which the paste was used the indications for terminating pregnancy were mainly pulmonary and cardiac lesions, in which avoidance of inhalation anæsthesia is an advantage. Table II shows that in 56 (nearly 80%) the method was successful without other operative procedures needing general anæsthesia. In most the abortion was complete, but in a few it was incomplete and needed ecbolics to complete it. In 15 cases (about 20%) the operation was unsuccessful. In those classed as complete failures the paste had no effect at all and abortion was effected under general anæsthesia by digital evacuation or by the introduction of bougies or a hydrostatic bag into the uterus. Partial failure means the production of an incomplete abortion with the paste and the use of other operative procedure needing general anæsthesia to complete it.

TABLE II—RESULTS OF THE PASTE METHOD OF TERMINATING PREGNANCY

Duration of pregnancy (weeks)	No. of cases	Average amount of paste used (ml.)	Average duration (hours) before onset of abortion	No. successful	No. unsuccessful		
					Complete failure	Partial failure	Total
12 or less	37	16·8 (8–23)*	27·7 (6–52)*	29	3	5	8
13–16	24	20·8 (15–40)*	43·5 (13-375)*	21	0	3	3
17–20	2	55 (30–80)*	..	0	2	0	2
More than 20	8	32·5 (15–70)*	19 (10–24)*	6	2	0	2

* Extremes

The figures, though not statistically significant, suggest that the method is more likely to be unsuccessful after the 16th week of pregnancy. Table II also shows that, on an average, the abortion can be expected to begin 24–48 hours after the injection of the paste.

At the suggestion of Mr. E. W. C. Buckell, late obstetric registrar at University College Hospital, the paste, mixed with an equal quantity of 'Neohydriol,' was inserted into the uterus of a patient (not included in the above series) who was 16 weeks pregnant and had pulmonary tuberculosis; 16 ml. of the mixture was injected, and complete abortion took place within 24 hours. Fig. 1 shows the paste, immediately after insertion, filling about the lowest quarter of the uterus. The fœtal spine can also be seen. Fig. 2 shows some of the paste still present in the uterus, and some in the left fallopian tube, after the abortion. Fig. 3 shows some of the paste in the pelvic portion of the peritoneal cavity four days after the abortion. Radiography thus indicates that the uterine contractions during the expulsion of the uterine contents may drive the paste along the fallopian tubes.

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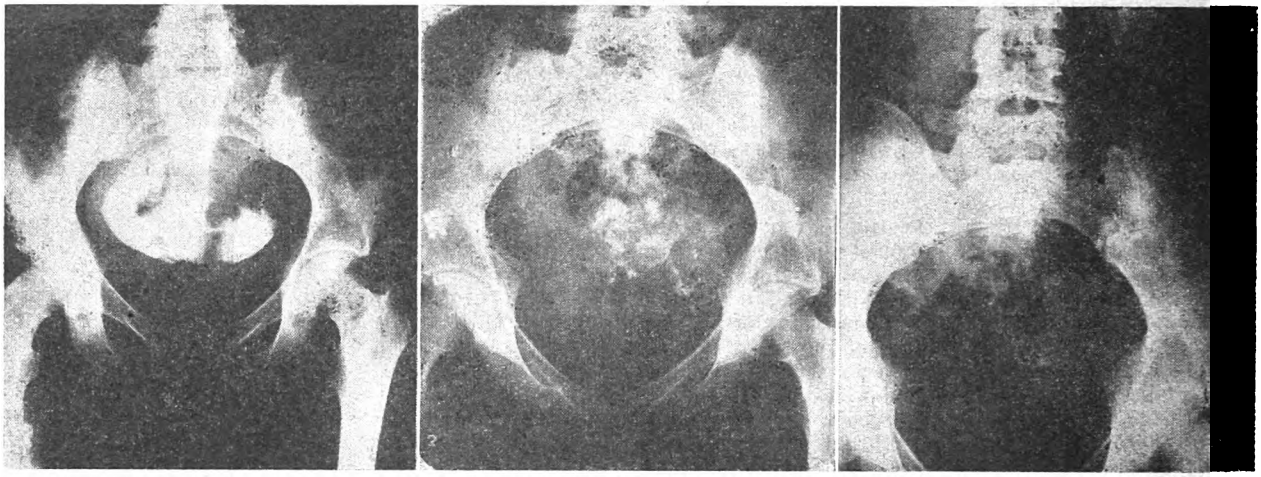

1 2 3

Fig. 1—Paste, immediately after insertion, occupying lowest quarter of uterus.
Fig. 2—Radiogram taken immediately after complete abortion, showing some paste still in uterus, and some in left fallopian tube.
Fig. 3—Radiogram taken 4 days after complete abortion, showing some paste in pelvic portion of peritoneal cavity.

DANGERS

The risks attached to this method of terminating pregnancy are hæmolysis, pulmonary embolism, perforation of the uterus, septic infection, subsequent sterility, and excessive bleeding after the abortion. Examples of all these complications have been described.

In our series there were no fatalities; nor have we seen hæmolysis, pulmonary embolism, or perforation of the uterus. In 7 cases there was pyrexia reaching morbidity standard after the operation: in 1 it was due to active pulmonary tuberculosis and preceded the interference; in 3 it followed other operative procedures used when the paste had been unsuccessful; and in the remaining 3 it followed the introduction of the paste (1 of these 3 patients was seen a year after the therapeutic abortion and no abnormality in the pelvis was discovered on examination). In some patients it was noticed that the temperature rose to 99°F after the introduction of the paste, but it fell to normal after the abortion.

It has not been possible to follow up all the patients whose pregnancies have been terminated in this way, but no case of sterility has been observed in the few cases followed up. On the other hand there are records of 4 patients who became pregnant again; and in 2 other patients, who were sterilised by abdominal tubal resection 9 months and 12 months after the therapeutic abortion, no evidence of tubal inflammation was found. Nevertheless the radiographic evidence mentioned above suggests a definite risk of chemical salpingitis from the passage of the paste along the fallopian tube during the uterine contractions and therefore of subsequent sterility.

There were 4 patients who had a heavy loss after the abortion. One passed clots for 8 weeks; another lost for 2 weeks; the third had a heavy loss at the first period 2 months after the abortion; and the fourth lost continuously for a month. The loss ceased without operative interference in the first 3 patients, and dilatation of the cervix and curettage were needed for the cure of the fourth. No chorionic tissue was obtained in these curettings. Two other patients lost more than usual owing to the abortion being incomplete and are included in the unsuccessful group as partial failures. Dilatation of the cervix and curettage were performed in each case 3 months and a month after the attempted termination and a small piece of placental tissue was removed. It seems possible that the continued bleeding in the 3 patients, and the menorrhagia in the fourth patient, whose abortions were complete was due to a hyperæmic reaction of the endometrium to the chemical irritation of the paste. There was no rise in temperature to suggest active infection in any of these 4 patients.

COMPARISONS

Table III compares the dangers of the paste method with those of other methods used since 1927 to terminate pregnancy of 16 weeks' maturity or less, for comparable indications. Pregnancies requiring urgent and immediate termination are excluded. The incidence of morbidity with the paste appears to be no greater

TABLE III—COMPARISON OF METHODS OF TERMINATING PREGNANCY OF 16 WEEKS' MATURITY OR LESS

Method	No. of cases	Morbidity	Deaths
Vaginal evacuation	28	2	0
Vaginal hysterotomy ..	8	0	0
Abdominal hysterotomy ..	31	2	2
Hysterectomy	6	0	0
Hydrostatic bag	2	1	0
Paste method..	61	4	0

than that with vaginal evacuation or with abdominal hysterotomy—the alternatives most often used.

Most pregnancies terminated by vaginal evacuation have been of less maturity than most of those terminated by abdominal hysterotomy, which is more dangerous to life: there were 5 deaths in 48 abdominal hysterotomies performed to terminate pregnancies of up to 26 weeks' maturity for conditions not requiring urgent termination. On the other hand, since 1927, 47 patients have been sterilised by abdominal resection of the fallopian tubes without a fatality, no other operation being carried out at the same time as the resection.

Our tentative conclusions are that, where other things are equal, vaginal digital evacuation of the uterus, and the soap-paste method, are both preferable to abdominal hysterotomy as means of terminating pregnancy; and that abdominal hysterotomy should not be chosen solely on the grounds that sterilisation can be performed at the same time.

CONCLUSIONS

By means of a soap paste we can expect to obtain a successful termination of pregnancy without the use of a general anæsthetic in some 80% of patients who have been pregnant 16 weeks or less. In the remaining

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20% further operative procedures under a general anæsthetic will be necessary.

The method is not intended to replace those used where an urgent and immediate evacuation of the uterus is required.

The procedure carries certain risks. In our series of 71 cases the ill effects have been limited to a few days' pyrexia in 6 patients (excluding the patient with active febrile pulmonary tuberculosis), and to some post-abortive bleeding in 4. The possibility of subsequent sterility from a chemical salpingitis cannot be neglected, but we have not seen this complication, whereas 4 of the patients subsequently became pregnant.

I wish to thank Prof. W. C. W. Nixon for permission to use the records of the obstetric unit, University College Hospital.

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THE VIABILITY OF TREPONEMA PALLIDUM

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FOR some months in 1943 field hospitals in Assam were without adequate facilities for dark-ground examination of material from penile sores. During this period, when capillary-tube samples from venereal sores were being sent to me by post or by courier, the question often arose of the reliability of this procedure, in view of the hazards to which such samples were exposed, some coming from isolated units in the jungle seventy or eighty miles away and taking four or five days in transit.

My colleagues could not give any categorical opinion about the normal expectation of viability of *Treponema pallidum* in such preparations, and the textbooks then available to us were not helpful. For instance, Topley and Wilson (1941) state of spirochætes that "some of the highly parasitic members, such as *T. pallidum*, are unable to survive outside the animal body for more than an hour or two." Stitt et al. (1938) merely state that exudate from chancres "should be examined fresh" with dark-field illumination. On the other hand, Muir and Ritchie (1937) state that, in sealed tubes, spirochætes may "retain their shape for days or weeks." Gradwohl (1938) is silent on this subject.

Accordingly I decided, in addition to the routine examination of specimens submitted from outside, to investigate the viability of *T. pallidum* in preparations made by ourselves from fresh untreated lesions.

METHOD AND FINDINGS

In 10 *consecutive* cases of typical Hunterian chancre of the penis in which I had just found *T. pallidum* on dark-ground examination, I made several preparations (the number depending on the quantity of serum obtained without undue discomfort to the patient), which were examined at intervals subsequently.

In cases 1–7, labouring as I was under the preconceived notion that *T. pallidum* was a delicate creature, several capillary tubes of serum from each case were taken, sealed, stored in the incubator at 37°C, and examined at intervals until the series of tubes was exhausted. In cases 1 and 2 typical motile *T. pallidum* was seen up to the seventh and sixth days respectively, and on the eighth and seventh days respectively morphological *T. pallidum* was readily identified but motility lost. This was encouraging, and, as it is difficult to obtain from a sore enough undiluted serum to fill more than six capillary tubes, I decided to examine the specimens on alternate days, as in cases 3–7.

In cases 1–7 (table I) *T. pallidum* remained viable and readily identifiable to the sixth day at least. In case 5 motile *T. pallidum* was seen in the last capillary tube, which was reserved until the tenth day before opening. In case 8 only two preparations were made as before, but these were kept at laboratory temperature and not examined until the tenth and thirteenth days, when both were found to contain numerous typical spirochætes still exhibiting natural movement. Case 10 was a similar preparation but had been inadequately sealed; on examination on the eleventh day it was found to be dried up, and no spirochætes were identified on emulsification of the residue in saline.

As the foregoing were consecutive cases, there seemed little doubt about the prolonged viability of the treponemata in the capillary tubes, and, to minimise labour, I decided to see how long the paraffined slide preparations remained positive—i.e., the original slide in which *T. pallidum* had been seen was reserved and examined daily. To avoid drying, I took care to use a fairly liberal drop of saline to mix with the serum and to ensure an adequate seal with the soft paraffin ring at the periphery of the coverslip. In each case several slides were made; some were kept in the incubator at 37°C, and some at room temperature. The findings are set out in table II. In every case *T. pallidum* continued to be readily identifiable and still motile from eight to fourteen days later. In case 14 morphological *T. pallidum* was seen on the sixteenth day on the slide kept at room temperature, but it was no longer motile. Usually the slides kept at room temperature gave better results, as they tended to dry less.

General Observations.—No special precautions were taken in making the preparations, the object being to collect the specimens of serum in much the same way as I would expect others to collect them for submission to the laboratory. The chief precaution was to ensure proper sealing of the capillary tubes and of the paraffined slide-and-coverslip preparations.

During the observations the daily room temperature varied between 5° and 18°C.

The presence of red blood-cells and of micro-organisms in otherwise reasonably good preparations did not appear to prejudice the result to any significant degree. There did not appear to be any great tendency for other bacteria to overgrow the spirochætes, and even in the incubated preparations, where there were large numbers of bacilli present, the spirochætes persisted quite well.

TABLE I—VIABILITY OF *T. pallidum* IN CAPILLARY-TUBE PREPARATIONS MADE FROM TEN CONSECUTIVE POSITIVE CASES OF TYPICAL HUNTERIAN CHANCRE

Case no.	Day of examination of preparation										
	1	2	3	4	5	6	7	8	10	11	13
1	+	+	+	+	+	+	+	?	..	..	..
2	+	+	+	+	+	+	?	..	..	..	..
3	+	..	+	..	+	+	..	?	..	..	..
4	+	..	+	..	+	..	+	?	..	..	..
5	+	..	+	+	..	+	..	+	+	..	..
6	+	+	+	+	+	+	..	..	..	..	..
7	+	..	+	..	+	+	?	..	..	..	..
8	..	..	..	..	..	..	..	..	+R	..	+R
9	..	..	..	+	..	+	..	..	..	..	.
10	..	..	..	..	..	..	..	..	..	−•	..

+, typical morphological *T. pallidum* with characteristic motility.
R, kept at room temperature all the time.
?, morphological *T. pallidum* not showing motility.
−, no *T. pallidum* found.
•, this specimen had dried up.

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TABLE II—VIABILITY OF *T. pallidum* IN PARAFFINED SLIDE PREPARATIONS, (*a*) KEPT AT 37°C AND (*b*) KEPT AT ROOM TEMPERATURE. EIGHT CONSECUTIVE CASES. PREPARATIONS ALL MADE FROM TYPICAL PRIMARY PENILE CHANCRES

Case no.	Day of examination of preparation															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
11 (*a*)	+	+	..	+	..	+	..	+	..	..	..	..	..	..	..	..
(*b*)	+	+	..	+	..	+	..	+	..	..	..	..	..	..	..	..
12 (*a*)	+	..	..	+	−	..	..	..	..	..	..	..	..	..	..	..
(*b*)	+	..	..	+	+	..	..	..	+	..	..	..	..	+	..	..
13 (*a*)	+	+	+	+	..	..	..	+	−	..	..	..	..	..	..	..
(*b*)	+	+	+	+	..	..	..	+	+	..	−	..	..	..	..	..
14 (*a*)	+	+	+	+	+	−	..	..	..	..	..	..	..	..	..	..
(*b*)	+	+	+	+	+	+	..	+	+	+	..	..	+	..	..	..
15 (*a*)	+	−	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(*b*)	+	+	+	+	+	+	..	..	..	..	..	..	..	..	..	..
16 (*a*)	+	+	..	..	+	..	−	..	..	..	..	..	..	..	..	..
(*b*)	+	+	..	..	+	..	+	..	+	−	..	..	..	..	..	..
17 (*a*)	..	..	..	+	..	..	+	..	..	..	..	+	..	+	..	−
(*b*)	..	..	..	+	..	..	+	..	..	..	..	+	..	+	..	?
18 (*a*)	..	..	+	+	..	..	..	+	..	..	..	−	..	..	..	..
(*b*)	..	..	+	+	..	..	..	+	..	..	..	+	..	+	−	..

+, typical morphological *T. pallidum* with characteristic motility.
?, morphological *T. pallidum* not showing motility.
−, no *T. pallidum* found.

Desiccation of the preparation in the incubator was the factor mainly responsible for impairing the longevity of the spirochætes. On the whole, the preparations kept at room temperature were more satisfactory.

In both tube and slide preparations the numbers of spirochætes appeared to be gradually reduced. Movements became more and more sluggish and finally ceased. In no case was there any evidence, so far as could be detected, of any multiplication of the spirochætes, even at incubator temperature.

On one occasion a spirochæte of *gracilis* type was also identified besides *T. pallidum* and remained viable somewhat longer.

Subsequent Experiences.—Unfortunately I could not pursue the investigation systematically beyond this point, but from time to time I made random observations and had positive slide preparations in which motile *T. pallidum* persisted for even longer periods, the longest being 34 days.

DISCUSSION

That *T. pallidum* is fairly viable outside the human body is not generally appreciated, nor is it generally recorded in the standard textbooks; but the observations here recorded are not unique, as I have since ascertained. A few references are given by the Medical Research Council (1931) to reports dating as far back as 1906, when Beer first reported that in a slide-and-coverslip preparation he had seen *S. pallida* still motile after 33 and 50 days.

In human necropsy material kept in the refrigerator the spirochætes have been found motile after 48 hours, and syphilitic necropsy material can remain infective for at least 24 hours. Enormous numbers of *T. pallidum* may be present in, for instance, macerated fœtuses, suggesting that *T. pallidum* can multiply in dead tissue under anaerobic conditions. Truffi found motile *S. pallida* in a primary chancre 52 hours after death of the patient. Gastou found the organisms in syphilitic child's liver up to 10 days after death, and Neisser found it in a stillborn fœtus 50 hours after birth (Neisser 1911).

Accidental infections, though rare, can and do undoubtedly take place in the necropsy room and in the laboratory. Hoffmann (1927, 1929), reviewing 40 reported cases (including some of his own), concluded that at least 22 of these were certainly genuine cases of this type. Of these 22 cases of accidental infection, 17 were contracted from necropsies on congenital syphilitic children or fœtuses; 3 from freshly acquired cases of syphilis; and 1 from the dissection in the laboratory of the brain from a case of general paralysis. The primary lesion in the accidentally infected person was on the fingers in 19 cases, on the neck in 1 case, and in the other 2 cases the site of the accidental lesion was unspecified—presumably the hand or the fingers. In 14 cases the persons so infected were the doctors performing the necropsy, in 6 cases necropsy-room attendants, and in 2 cases laboratory assistants handling specimens outside the necropsy room after the necropsy (the brain of the general paralytic being one of these specimens).

It is commonly assumed that the risk of accidental transmission of syphilis by therapeutic transfusion of blood is negligible, and before 1939 there was no report of any such case in Britain. However, some 70 well-authenticated cases have been recorded in America and on the Continent since the first description by Fordyce in 1915 (McCluskie 1939). In almost all of these the infections took place when the donors were in the primary or secondary stage of syphilis. McCluskie (1939) reported a case in which syphilis was transmitted by a donor still in the pre-chancre stage and while the Wassermann reaction was still negative; and he summarised 2 similar classical cases of this category reported by Post and Cooney (1933) and Pautrier (1936).

Whether the practice of refrigeration of stored blood in blood-banks would itself necessarily ensure rapid death of any spirochætes present may also be questioned in view of the reported resistance to cold of the organism in culture. Kissmeyer (1923), working with pure cultures obtained from the State Serum Institute in Copenhagen, reported having subcultured *S. pallida* after keeping it at −16°C for 3 months but stated that at 2°C they died after some days. Krantz (1923) showed that cultures of *S. pallida* could multiply at room temperature; after culture at 0–5°C for 4 days the spirochætes were readily recognisable, though non-motile, but viability persisted, since they grew on subculture. Krantz also froze his culture at −20°C for an hour and found the organism still strongly motile 48 hours after thawing. More recently it has been shown that when spirochætes are maintained in the frozen state at −78°C they may remain virulent for at least 3 years (Turner and Fleming 1939), but at −20°C virulence disappears within 2 months (Turner 1938).

While I was actively interested in this question of the viability of spirochætes, Selbie (1943), at the Bland-Sutton Institute of Pathology, Middlesex Hospital, was investigating how long *T. pallidum* remained infective in stored blood, plasma, and serum at low temperatures. Suspensions of rabbit chancre in rabbit plasma were stored at 5°C and tested for virulence at various periods thereafter. He found the period of survival to be about 6 days—rather longer than the period found by other workers investigating the same problem. Despite this, he considered the transmission of syphilis by stored blood to be unlikely, because "in the first place, the numbers of spirochætes in the infected plasma were many times greater than those encountered in human syphilitic blood; secondly, the infected plasma was injected, not into the blood-stream, but into a sensitive tissue, thus largely precluding the operation of the natural defences of the host."

SUMMARY

In 10 consecutive cases of penile chancre in which *T. pallidum* had just been found, series of capillary tubes of serum were prepared, sealed, and stored for subsequent examination.

In cases 1–7 and 9, in which the tubes were stored in an incubator at 37°C (98·6°F), *T. pallidum* remained viable at least six days (in case 5 ten days).

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In case 8, in which the tubes were stored at a room temperature of 5–18°C (41–64·4°F), *T. pallidum* remained viable ten and thirteen days. In case 10, in which the tube was not properly sealed, no spirochætes could be identified on examination on the tenth day.

In a further 8 cases the original slide preparations in which *T. pallidum* had been identified were sealed with soft paraffin and stored either at room temperature or in an incubator at 37°C. In each case *T. pallidum* was viable for eight to fourteen days. Viability was longer in the slides kept at room temperature.

In a subsequent experiment viability persisted thirty-four days.

These experiments confirm the findings of other workers, and attention is drawn especially to the reports of infection with syphilis from necropsy material.

I wish to thank Lieut. Arjan Singh Man, I.A.M.C., for his collaboration throughout the technical work.

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INTRABRONCHIAL PENICILLIN FOR LUNG ABSCESS

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IN lung abscess conservative methods of treatment are successful only in exceptional cases, so that surgical treatment has been adopted as a routine. This practice was not changed by the advent of ultra short-wave therapy or of sulphonamides; but the introduction of antibiotics reopens the question.

In February, 1946, I first treated a case of pulmonary abscess with penicillin given systemically in a dosage of 240,000 units a day. This abscess, which was about 7 cm. in diameter and situated in the right lower lobe, decreased in size, while there was a fall in temperature, a reduction in the amount of sputum, and general improvement; but though the penicillin undoubtedly produced immediate benefit it did not lead to a final cure.

Endobronchial Application.—An attempt was therefore made to increase the concentration of penicillin inside the abscess cavity by introducing the drug through a plastic tube inserted into the appropriate main bronchus after anæsthetising the pharynx and air-passages. Penicillin 50,000 units was given in this way into the main bronchus on the affected side, the patient being placed in a suitable position to enable the penicillin to reach the abscess cavity with the aid of gravity. The procedure was the same as that used in bronchography. The patient was instructed to keep in this position for three or four hours or longer if possible. An essential point was the control of coughing.

After this treatment there was an immediate fall in temperature and less sputum; the abscess cavity then got steadily smaller and ultimately disappeared completely. The penicillin was given intrabronchially at intervals of two or three days; 3–8 treatments being given in all.

Inhalation.—On the days when penicillin was not applied intrabronchially it was given by inhalation from an atomiser. This apparatus (fig. 1) was connected

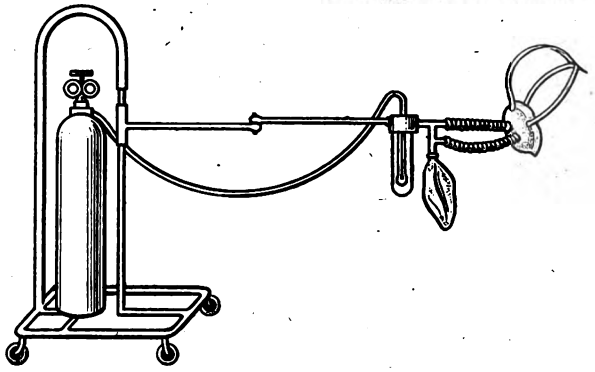

Fig. 1—Penicillin atomiser and inhaler.

to an oxygen cylinder and the expired carbon dioxide was rebreathed, inducing deep respiration, which appears to be essential for obtaining good results from inhaling penicillin. The daily dose was 50,000–80,000 units, divided into two or three inhalations. Since penicillin, though thermostabile in a powder, needs to be kept cool when in solution, the glass container was enclosed in a second container holding ice-water (fig. 2). To prevent cross-infection by the inhalation set when used by one patient after another, each part of the apparatus is sterilised.

The regular inhalations are a useful supplement to the intermittent intrabronchial therapy, but it would probably not cure a lung abscess if used alone, because the penicillin is dispersed through all the air-ducts and thus does not maintain a sufficient concentration in the abscess cavity.

Results.—Of 11 cases treated with intrabronchial penicillin only 1 was lost: an abscess in the right upper lobe in a patient aged 69 in a bad general condition caused sudden death. The 10 other cases were definitely cured.

In 1 case there were two relapses, four and five months after the end of the first febrile period. Both of them were controlled by further treatment with systemic and intrabronchial penicillin.

In 1 case tyrothricin was given intrabronchially, with a good result; the reduction in the amount of sputum seemed to take place earlier and faster than was usual with penicillin.

SUMMARY

Intramuscular penicillin may be expected to produce improvement but not final cure in lung abscess. The method of choice appears to be the intrabronchial administration of penicillin supplemented by frequent inhalations.

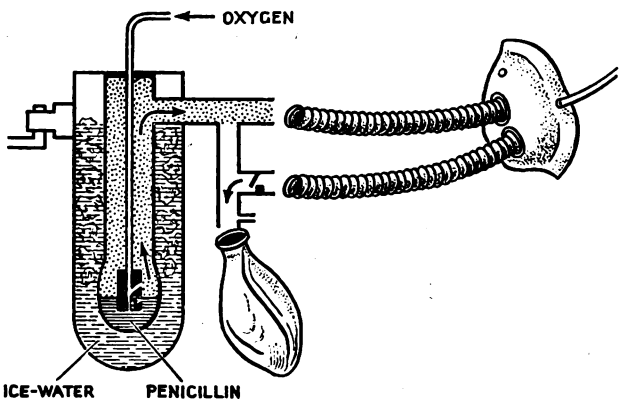

Fig. 2—Penicillin container enclosed in iced-water container

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Of 11 cases treated by this method 10 completely recovered.

I wish to thank Dr. L. Laub, late chief of the department of laryngology, St. Roch's Hospital, for his skilled coöperation in applying the local treatment.

ADDENDUM

Mr. C. Price Thomas, of the Brompton Hospital, was good enough to draw my attention to the fact that, about the same time, similar experiments were carried out, with similarly good results, by Mattei et al.[1] at Marseilles.

AN EASY TECHNIQUE FOR INTRAVENOUS CANNULISATION

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THE technique described here has been used on twenty-five patients at the Royal Northern Hospital, Holloway. It is a simple, speedy, and effective method for introducing a blunt cannula into a vein.

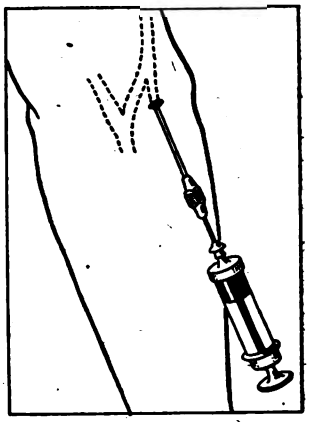
It has advantages over the West Middlesex needle method in that it is much easier and does not need a vein junction for its performance. Experience shows that the West Middlesex needle tends to pierce veins or slip past them unless one enters a fork where two veins join—e.g., at the origin of the cephalic vein at the back of the wrist. The method described here can be used at this point, the bend of the elbow, the long saphenous vein in front of or above the medial malleolus, or any vein which can be distended sufficiently for an intravenous needle to enter. It does not destroy the vein used and is successful in all but extremely collapsed or very small veins and thus has definite advantages over a tied-in cannula. It is also much quicker to perform and the whole transfusion can be set up in five minutes.

Requirements.—These are simple and will be found in most wards:

(1) a medium-sized (about S.W.G. 18) straight blunt cannula of the West Middlesex or Jubé type; or alternatively a sharp-ended intravenous transfusion needle which has had its tip filed off;
(2) a fine lumbar-puncture needle which will go through the cannula easily and protrude from its tip for $^3/_4$–1 in.;
(3) a small syringe;
(4) a fine hypodermic needle;
(5) a small scalpel;
(6) an adapter.

Procedure.—Choose any suitable vein and inject local anæsthetic intradermally about $^1/_2$ in. distal to the point where it is proposed to enter the vein. All that is necessary is to raise a small weal. While the local anæsthetic is taking effect, set up the intravenous apparatus in the usual way and attach the adapter, which is going to fit into the cannula, to the end of the rubber tubing. Next make a short skin incision (less than $^1/_4$ in. is sufficient) and push the cannula through this to ensure its going through easily when the time comes. The lumbar-puncture needle is attached to the syringe which has been used for the local anæsthesia, and the cannula is slid over the needle so that its base lies next to the base of the lumbar-puncture needle.

The vein to be used is then distended. If the long saphenous vein is being used, it is useful to have a sphygmomanometer cuff round the calf. Next, insert the lumbar-puncture needle and the tip of the cannula through the skin incision (see figure). This latter point is important, since it prevents difficulty at a later stage. If the cannula tip is left outside the incision it tends to become caught on the edge of the skin in passing through the incision at an acute angle. Enter the vein in the usual way about $^1/_2$ in. proximal to the incision and slide the needle into the vein slightly further after ensuring, by withdrawing blood, that the vein has been entered. Then slide the cannula along the needle into the vein with the right hand, steadying the syringe with the left as this is done. There will be a definite feeling of resistance as the cannula enters the vein; it is then slid right in up to its base, and the syringe and needle are withdrawn after compression has been released. Blood will then trickle out of the cannula, and the adapter is attached and the transfusion started. The cannula and tubing are strapped to the part in the usual way, but it is unnecessary to splint the limb unless the patient is restless or a vein at the bend of the elbow is being used. When the time comes, the cannula is simply pulled out and a small dressing applied.



My thanks are due to Mr. Hamilton Bailey, F.R.C.S., for advice and encouragement, and the nurses of the Royal Northern Hospital for patient assistance.

1. Mattei, C., Recordier, M., Métras, H., Barbe, A. *Pr. méd.* March 23, 1946, p. 185.

GLANDULAR ENLARGEMENT IN ADULTS

REVIEW OF NINE CASES

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DURING the late war I saw occasional cases of enlarged lymphatic glands, with or without a rash and pyrexia, where the blood changes did not correspond to those of glandular fever.

These cases presented some difficulty in diagnosis, and there was always doubt whether they were isolated atypical cases or a separate syndrome. For this reason this small group of cases, occurring on board ship, is reported, and because the pathological investigations did not seem to confirm the clinical diagnosis.

The cases were distributed over two voyages in the same ship: 7 on the first voyage and 2 on the second.

The group of 7 patients were seen within a period of 16 days, 5 of them being members of the crew and 2 passengers. All 5 of the crew were about 21 years old. The histories of all the cases were similar, except where stated.

The patients first complained of a "lump behind the ear," which proved to be a painful enlarged lymph-gland. Further search showed that glands were enlarged on both sides of the neck, in the axillæ, and to a lesser extent in the groins. The spleen was impalpable throughout the illness, and the patients were apyrexial. In 5 cases there was a macular rash on the chest (unnoticed by the patients), which faded in a few hours. A sixth patient had a macular rash on the face only, and the remaining patient had no rash at all. Blood films done on board showed a moderate leucocytosis (11,000–14,000 per c.mm.) and an increase in mononuclears (14–25%). These cases were diagnosed as glandular fever (infective mononucleosis).

Cases 1, 2, and 3, in which the disease began on March 19, 21, and 24, 1947, respectively, were further

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investigated ashore. All 3 patients returned to duty on April 2.

Cases 1 and 2 were sent to the Royal Melbourne Hospital on March 27. Both gave negative Paul-Bunnell tests and a leucocytosis of 10,000 per c.mm. The reports on their blood smears made in Melbourne were as follows:

Case 1.—"The differential leucocyte-count shows an absolute lymphocytosis of moderate degree (37·5%) with an occasional atypical cell and some increase of monocytes (10·5%). These findings could be consistent with the convalescent stages of glandular fever."

Case 2.—"The differential count shows a relative lymphocytosis (47%). There are no features present now which might support a diagnosis of glandular fever."

On April 2 these 3 patients were sent to St. Vincent's Hospital, Sydney. All gave negative Paul-Bunnell, Wassermann, Kline, and Eagle tests, and "there was no evidence of glandular fever seen in the blood films." Cases 1, 2, and 3 had 7000, 8200, and 11,000 leucocytes respectively per c.mm.

On the next voyage there was a sequel, or possibly 2 further unrelated cases.

Case 8.—On June 27 an assistant cook, aged 21, who had been on board the previous voyage, complained of pain behind his mastoid.

On examination: temperature 99·6°F; ear drum normal; no history of ear discharge; no palpable enlarged glands.

Patient was seen again that evening, when his temperature was 101·2°F and pain was acute. He was placed in the ship's hospital for observation.

It was not until June 29 that he developed enlarged glands in the neck and axillæ, and later in the groins. His spleen was then palpable and became more so next day. On the third day he had epistaxis.

His pyrexia settled on June 30. There was no rash, and patient gradually recovered, returning to duty on July 8.

On July 15 this patient was sent for investigation to St. Vincent's Hospital, Sydney, where the Paul-Bunnell, Wassermann, Kline, and Eagle tests were reported negative, and a white-cell count showed 9000 leucocytes per c.mm. (neutrophils 55%, lymphocytes 35%, monocytes 7%).

Case 9.—On the evening of July 19 an assistant cook, aged 20, complained of a rash which had appeared that morning on his ankles and by evening had spread over his legs, trunk, and arms. He also said he had had pain in the groins for eight days.

On examination: no palpable glands in neck, but glands in axillæ and groins were enlarged, and spleen was palpable. No pyrexia.

Patient recovered and returned to duty on July 24.

On July 21 he was sent for investigation to the Royal Melbourne Hospital, where Paul-Bunnell, Wassermann, and Kahn tests were reported negative, and leucocytes 9800 per c.mm. (monocytes 5·5%): "The differential leucocyte-count shows a shift to the left in the granular series and a very slight relative and absolute lymphocytosis (31·5%). These findings do not suggest that the patient has glandular fever."

DISCUSSION

In view of the long period between the last two cases and the previous group and the slightly different syndrome shown, it is thought that these two cases are unrelated to the previous group, unless there was a series of symptomless carriers relaying the infection.

It has been suggested that these cases might be atypical rubella; but it seems most unlikely that a series of nine cases of atypical rubella would occur without several typical cases appearing, and the last two cases had enlarged spleens, and case 9 also had enlarged glands in the axillæ and groins but not in the neck.

The nearest clinical entity that I have found in the literature is "acute infectious lymphocytosis in young adults" reported by Duncan (1945). This condition was first reported in children by Smith (1941). However, both of Duncan's patients showed a greater leucocytosis (28,000 and 22,000 per c.mm.) and a greater lymphocytosis (85% and 67%), and both had a mild upper respiratory infection. Yuskis (1946) also reported a case in an adult. His patient had only 19,200 leucocytes per c.mm. but of these 80% were lymphocytes, and the lymph-glands were not enlarged. Steigman (1946) states that the disease is almost confined to children.

Contratto (1944) believes that cases of mononucleosis with negative Paul-Bunnell tests do occur. However, it seems unlikely that all 5 of my patients who were investigated should show this peculiarity.

Shafar and Weir (1943) reported a series of almost 200 cases of what they considered clinically to be glandular fever, in which the Paul-Bunnell reaction was negative with but few exceptions, and they suggested that there may be various types of "glandular fever."

SUMMARY

A series of 9 cases is reported, which were clinically similar to glandular fever, but where the pathological findings did not support this diagnosis.

The diagnoses of atypical rubella and of atypical glandular fever are discounted by the fact that there were no typical cases.

The resemblance to acute infectious lymphocytosis (Duncan 1945) is pointed out.

I wish to thank Mr. J. Macnamara, F.R.C.S., of Sydney, my late assistant surgeon, for his help and interest; Dr. H. J. Gardner, of the Royal Melbourne Hospital, and Dr. G. Rudd, of St. Vincent's Hospital, Sydney, for their pathological investigations and interest in these cases.

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Preliminary Communication

STREAKINESS OF BLOOD FILMS

RELATION TO SEDIMENTATION-RATE AND PLASMA-FIBRINOGEN

IN 1936 we became interested in the "streaky" naked-eye appearance of certain blood films, for one of us (R. M. B.) noticed that this was visible only when the erythrocyte-sedimentation rate (E.S.R.) was raised.

The streakiness is seen in blood films made on ordinary microscope slides, a drop of blood direct from the finger being placed on the surface of one slide and then drawn out into a film with the edge of a second slide. With normal blood the film is perfectly smooth; but when the E.S.R. is raised the film is broken up into longitudinal rivulets (see figure). Each rivulet starts with a "knob" and tapers to its termination. The appearance is characteristic and in no way resembles the messy smears one gets from using dirty slides, or the spurious streakiness seen when the edge used for drawing out the film is serrated.

This phenomenon was demonstrated at a meeting of the pathological section of the Royal Society of Medicine in 1939. It was clear that one of the reasons why streakiness had previously passed unnoted was that it had been ascribed to faulty technique.

We soon found that streakiness was not affected by anæmia but was closely correlated with the E.S.R. after correction for any coexisting anæmia. This naturally greatly enhances the clinical value of the observation.

RELATION TO ROULEAUX FORMATION

Shortly after the meeting mentioned above, Professor Waldenström, of Uppsala, told us that Swedish hæmatologists regarded the appearance as due to excessive rouleaux formation; and we have little doubt that they

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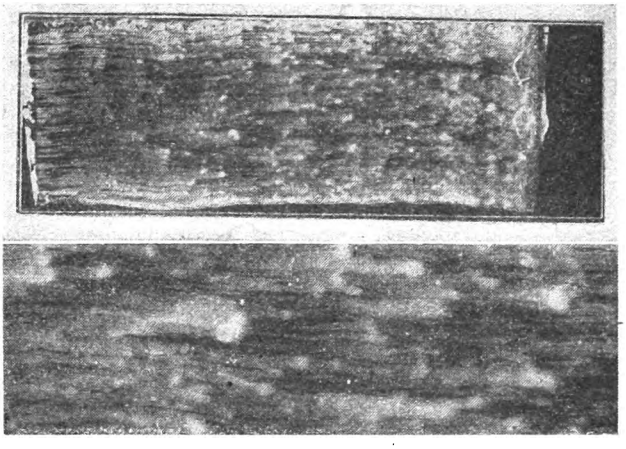

Above: streaky blood film on microscope slide.
Below: enlarged view of part of film, showing typical knobs at head of each streal.
Arrow indicates direction in which film was spread.

had confused the streaky films with the phenomenon described by Fahraeus,[1] in which a large drop of blood is allowed to flow over a slide, and a granularity gradually appears within it. This granularity is in fact rouleaux formation and its degree naturally runs parallel to the E.S.R.

That streakiness did not represent rouleaux formation was shown by microscopical examination, for though the cells in the rivulets were closer together than elsewhere on the slide they were not usually even in contact with one another. Nevertheless its very close parallelism with the E.S.R. suggested that streakiness had some connexion with rouleaux formation; and we felt that it might represent a preliminary stage in the process—a coming together of the cells before they formed chains.

Between 1939 and 1946 large numbers of cases were collected which confirmed the close correlation between streakiness and the corrected E.S.R.; but further investigation was impracticable during this period. Early in 1946 we saw a case of myelomatosis with an extremely rapid E.S.R. but no streakiness—the first gross exception to our rule that we had come across. Moreover the blood films of this patient, though perfectly homogeneous to the naked eye, showed extreme rouleaux formation under the microscope. Clearly, then, rouleaux and streakiness were fundamentally independent of one another. Another significant finding in this case was an extremely high serum-globulin and a normal plasma-fibrinogen. About this time we obtained some human fibrinogen and showed that, as the plasma-fibrinogen was increased, the E.S.R. and streakiness increased quantitatively. These two sets of data forced us to conclude that, whereas rouleaux formation and E.S.R. increased with increasing amounts of either fibrinogen or globulin, streakiness was produced only by an increased amount of fibrinogen.

In view of this finding it seemed possible that streakiness might be due to the precipitation of fibrin—that in drawing out a blood film one partially defibrinated the blood. This possibility was excluded by showing that streakiness was equally well developed in oxalated or citrated blood. This observation was important, since it enabled us in future experiments to work with blood containing an anticoagulant.

We next found that minute traces of bile-salts added to the plasma not only brought sedimentation to a standstill but also completely ironed out streakiness. Both phenomena were eradicated by a lowering of the surface tension, so presumably both phenomena depended on surface forces. It is known that rouleaux formation is the result of surface forces acting at the interface between the cells and the plasma; was it possible that streakiness was produced by surface forces acting at the interface between plasma and air, or between plasma and the glass surface of the slide? If that was the case one would expect that plasma freed from cells would show streakiness; but all our attempts to demonstrate this were in vain.

1. Fahraeus, R. *Acta med. scand.* 1921, 55, 3.

FIBRINOGEN

We finally consulted Prof. E. K. Rideal, of the Royal Institution, who on examining our streaky films said that the appearance was undoubtedly due to the molecular aggregation and partial denaturation of the protein in the plasma. He suggested that we should again try to demonstrate streakiness in plasma films. This we did, and, after many failures, one of us (T. H. N.) suddenly noticed that if, while the plasma film was still wet, one examined its surface by reflected light, one could detect a series of longitudinal ridges. Once noted the effect was obvious; and we soon demonstrated that the degree of waviness of plasma films ran parallel to the streakiness of the corresponding whole-blood films. Moreover, when we made films from the serum of blood which gave streaky blood films and wavy plasma films, the serum films were always perfectly smooth. Thus we obtained striking confirmation of Professor Rideal's suggestion that streakiness was due to a molecular aggregation of the protein, and of our own earlier conclusion that streakiness depended on the fibrinogen and not on the other plasma-proteins.

Mr. E. M. Shooter, one of Professor Rideal's research-workers, has since pointed out to us why this should be so: for molecular aggregation is much more likely to occur with the elongated molecules of fibrinogen than with the much less elongated molecules of globulin and albumin. Since then we have found two further cases with a very high E.S.R. and little or no streakiness, and in both cases the globulin has been much raised and the fibrinogen about normal. Further, Mr. Shooter gave us a small quantity of human γ-globulin with which we increased the E.S.R. to a high figure without producing any streakiness.

CONCLUSIONS

Further work has confirmed that streakiness gives a useful clinical indication of the plasma-fibrinogen level; that in the great majority of cases it is a useful indication of the corrected E.S.R.; and that a combination of the observation of streakiness with a measurement of E.S.R. is a convenient method for detecting those rare cases in which there is a gross increase of globulin with little or no increase in fibrinogen.

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M.D. Berlin
R. L. WATERFIELD
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Hæmatologist to Guy's Hospital.
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Chief Technician in the Hæmatological Laboratory.
Guy's Hospital, London.

. . . It should not be denied that the long-run aim of societies aspiring toward human freedom is to get rid of power, and to bring into existence a free man's commonwealth in which coercion is neither threatened, applied nor desired. This is the thread of anarchist idealism that appears in all uncompromising applications of the key conception of human dignity. When Engels wrote of the eventual "withering away of the state" he was voicing the hope, though not necessarily the certainty, of the radical democrat. In our day, however, the probability that we can reduce power to the vanishing point seems very remote indeed. The urgent task is to chasten and subordinate power to the service of respect.—Prof. H. D. LASSWELL at New York Academy of Medicine, Nov. 14.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Child Guidance in the Health Service

AT a meeting of the section of pædiatrics on Nov. 28, with Dr. W. G. WYLLIE, the president, in the chair, a discussion on the place of child guidance in the new health service was opened by Dr. IAN SKOTTOWE. The child-guidance movement in organised form dates, he said, from 1929; and it embraces all child psychiatry except gross mental deficiency. The movement has become highly specialised; and it is perhaps a little isolated from general medicine and other branches of psychiatry. Account must be taken of more specialties than are implied by dynamic psychopathology alone; and there are strong arguments for integrating child guidance with the new health service. Of 100 children up to the age of 16 seen at the psychiatric clinic of the Royal Buckinghamshire Hospital, Aylesbury, 64 were referred by family doctors; 31 were aged 14–16; and no fewer than 33 had significant somatic disease requiring treatment in another special department, while in a further 9 some somatic investigation was required. Of the 100, 43 needed skilled psychotherapy, 19 the services of an educational psychologist, 18 social service, and 10 residential treatment of one sort or another. From recent surveys had emerged the idea of (1) child-guidance centres, associated with schools and not controlled by doctors, and (2) child psychiatric clinics at general hospitals to which children needing treatment would be referred. This concept had been criticised because of the so-called "dual administration"; but there was nothing inherently impossible about such an arrangement.

Dr. A. A. E. NEWTH emphasised that most maladjusted children are basically normal; but close medical supervision was important. The unification of psychiatric services, sometimes advocated, had its drawbacks; was the mental-hospital psychiatrist likely to be sympathetic to the mild psychological mishaps of childhood? Moreover, too close an association of child-guidance clinics with other mental services might enhance the diffidence of parents in seeking advice. In Dr. Newth's experience most cases were referred initially by teachers, only some 8% being sent in the first place by doctors. Very distressing behaviour might result from trivial maladjustment, while severe maladjustment might evince itself by only slight behaviour disorder. Educational psychologists should not be shouldered with the responsibility of classifying the disorders, for these cases, he said, were complicated and had many and deep roots; the identification of these roots was the more difficult because the very person reporting the disturbance was sometimes largely responsible for it. Thus the American idea of a team was inescapable. The trouble was often sown in early childhood, symptoms becoming apparent only by contrast with others at school; it was therefore reasonable for educational authorities to have a hand in dealing with the disorder. Buildings for the centre should, Dr. Newth suggested, be near to, but separate from, the school; and mentally deficient or psychotic children should not be seen there. Schemes for such centres could not be complete in themselves; for the backing of children's hospitals and of pædiatricians was essential.

Dr. MILDRED CREAK agreed that symptoms are no guide to the condition; so initial investigation should be by the experienced and expert. The waiting-list was a major problem at most clinics; and a first step must be to remove it. The psychiatric problems seen in children's hospitals differed from those at clinics, for they included a large proportion of psychosomatic disturbances. Parents naturally sought a physical explanation for psychogenic disturbances; and it was most important that such states as hysterical vomiting should be quickly referred to the psychiatrist before they became fixed. Clinics whose work was confined to diagnosis tended to widen the gap between general medicine and psychiatry; and students should have the chance to see cases being treated. The psychiatrist working alone was as helpless as the surgeon alone; the psychiatrist should be supported by an educational psychologist and a psychiatric social worker.

Dr. H. S. BRYAN held that, since psychosomatic disorders were so common in children, it was more important for the children's psychiatrist to have had experience in pædiatric departments than in mental hospitals. If child guidance was to be fully effective it must become preventive by reaching every child at an early age. The health visitor might, by extra training, become the spearhead of the attack.

Prof. C. W. VINING was opposed to division between pædiatrics and child psychiatry.

Dr. LETTITIA FAIRFIELD contended that child-guidance clinics should be multiple rather than uniform in character. There was need for the screening of cases, and teachers and other school authorities should be able to deal with "naughty children." Up to 1929 pædiatricians had contributed nothing to child guidance "except to give thyroid to mongols"; but of course that was now changed. In a non-equalitarian country such as Britain doctors and nurses in hospitals did not understand the situation in schools from which cases were referred.

Dr. L. G. HOUSDEN said that parents should be enabled to guide their children. The attitude of modern young people was epitomised in an essay by a nineteen-year-old girl who wrote: "I shall send my child to church and Sunday school. Then if it does anything wrong, they can't say it was my fault."

Dr. J. D. KERSHAW deplored the defeatism by which the psychiatrist lurked in the hospital and advanced half-way to meet the maladjusted child, at the child-guidance clinic. He should be based on the clinic and from there move forward the whole way to meet the child. Dr. Kershaw suggested that maladjusted children would be fewer if parents were provided with the physical means for affording the right environment. The child should be considered in relation to his home background and his future.

Dr. A. F. ALFORD (Ministry of Education) said that the child-guidance clinic was to be the pivotal point between the educational service and the National Health Service; in treatment there would be no watertight division between the personnel of the two services, and the patient was to be treated as a unity.

MANCHESTER MEDICAL SOCIETY

Prognosis of Mental Disorders

AT a meeting of this society on Nov. 5, Dr. G. HOWARD KITCHING, opening a discussion on the prognosis of mental disorders, said that the patient and his relatives want to know not only whether he will get better, but also whether he will be completely well, and what effect the illness will have on his future, on his work, and on his married life. All mental disorder arises from one, or from combinations of two or more, of four groups of precipitating causes: weaknesses or tendencies in the innate constitution; the tendency for mental illness to occur at the epochal crises of life (puberty and the menopause); exceptional mental experiences such as "shocks," which to operate must be major experiences affecting the patient's self-esteem; toxic or structural damage to the nervous or other systems.

He grouped mental disorders under four principal headings:

A. Those in which cerebral capacity is reduced. If the condition is congenital the case is one of mental defect of varying degree; if acquired, the case is one of organic dementia. Confusional states may be included in this group. The prognosis of mental defect is, of course, radically stationary and hopeless. In the inorganic dementias the ultimate tendency is downhill, but often with surprisingly long remissions, especially if the onset is acute and associated with some toxic cause.

B. Those in which mental coördination is reduced. This group includes all those diverse conditions which have as a fundamental feature a discrepancy between thinking and feeling: the schizophrenic-paranoid series of illnesses. In general the prognosis of this group of disorders is bad. Cases with an acute onset have a better outlook than those of

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insidious onset, and the prognosis is much affected by the duration of the condition. Obsessional disorder may also be included under this heading.

C. Those in which control is reduced. In these, affective disorders, or disturbances of feeling, show themselves as excess of elation, depression, or anxiety. The response of affective disorder in general to electro-convulsive therapy (E.C.T.) is specific and dramatic, and it successfully cures many of the minor cases as well as most of the major ones.

D. Reactions to situations in which the provoking situation appears to be a predominant factor. This group includes most of the psychoneuroses, and hysteria and anxiety hysteria. A strong element of constitutional predisposition has to be postulated in the patient, for the situations which provoke these disorders are fundamentally common to all people, whereas the neurotic reactions are not.

He considered prognosis collectively and individually. The number of people certified annually in any community is an index of its mental-hygiene movement. A good supply of psychiatric social workers and a vigorous mental-hygiene movement increase the number of certified cases, because they help in the disposal of cases to appropriate hospitals. In England the number of people under certificate is 5 per 1000 population. In any community the amount of serious crime varies inversely as the number of people certified, and one may take it that one mental-hospital bed is roughly the equivalent of one prison bed. Discharge-rates, he considers, are completely fallacious and mean nothing. The average length of stay in an institution is more than 10 years, or one-sixth of the duration of life. Statistics tend to show that psychosis is essentially a chronic and relapsing illness, analogous in medicine to gout, allergy, psoriasis, and diabetes. Statistically, the value of new therapeutic procedures—such as insulin shock for schizophrenia—is extremely problematical.

Of individual prognoses, that in cases of affective disorder has been completely altered by E.C.T. The natural prognosis of involutional depressions was that a third got well, a third remained stationary, and a third went downhill. With E.C.T. a recovery-rate of 80% or over may be confidently expected; and this treatment is almost equally valuable in states of elation, which are much less common than depressive states. It appears to have little real value, however, in schizophrenia or other psychoses.

The prognosis of schizophrenia remains baffling, for the diagnostic criteria vary from country to country, and even from worker to worker. Most workers favour treatment by insulin shock therapy, which reduces the duration of stay in hospital and produces a higher percentage of remissions in acute cases; but such improvements are often not maintained, and the long-term results tend to approximate to those of the untreated disorder.

Prefrontal leucotomy has also altered the prognosis of mental disorder. The results are difficult to assess, because—since it produces irreversible changes—it is not tried (except by uncritical enthusiasts) in early cases until other methods have failed. It cures many depressive and agitated states which have failed to respond to E.C.T., has produced good results in schizophrenia, and in many cases has changed a socially unacceptable psychosis into a socially acceptable one. Drug-addictions, including alcoholism, have a bad prognosis, and need psychotherapy combined with institutional treatment. One authority has estimated that 10% of cases are cured and remain well for three years. Statistical studies of the psychoneuroses and of the value of psychotherapy are at present almost valueless because they depend too much on subjective assessments made by patient and doctor.

Reviews of Books

Diseases of the Chest with Emphasis on X-ray Diagnosis

E. H. RUBIN, M.D., attending physician, division of pulmonary diseases, Montefiore Hospital, New York. London: W. B. Saunders. 1947. Pp. 685. 60*s*.

Dr. Rubin, in his preface to this elaborate volume, says that he designed it for general practitioners, sanatorium physicians, medical students, and radiologists. It is doubtful whether any specialised textbook has ever been written which could appeal to so varied an audience, and this one is no exception. It is far and away too detailed for the busy general practitioner, and most of it demands a knowledge of radiology and clinical pathology which no medical student could possess. Considered as a book by a specialist for specialists it has much to recommend it, and in some ways it breaks new ground, differing from other books on chest diseases in its emphasis on surgery and radiography. In the sections on suppuration, tuberculosis, and neoplasms, the author always gives a reasoned evaluation of surgical treatment based on his own wide experience, and in addition his brother, a thoracic surgeon, has contributed a brief and well-written résumé on surgical procedures in the chest. Dr. Rubin undoubtedly has a profound knowledge of chest radiology, and his analytical approach to interpretation should be followed by all chest physicians. Many of his descriptive terms for X-ray pathology are unhappy, however, and there is insufficient attention to the radiological points which help in differential diagnosis. As against these faults of omission, the book is a mine of detailed information readily found through an excellent index. It is ideal reading for higher medical examinations.

Psychology of Women

Vol. II. *Motherhood*. HELENE DEUTSCH, M.D., associate psychiatrist, Massachusetts General Hospital. London: Research Books. 1947. Pp. 439. 25*s*.

THESE volumes, the first of which we reviewed last year (1946, ii, 946), are frankly a psycho-analytic interpretation, and may seem at first reading to exalt the psychic at the expense of the somatic manifestations of disordered function. It is startling, for example, to be told that a woman is capable of postponing the delivery of her child for psychological reasons; yet the converse—that miscarriage can be induced by anxiety and other psychic states—is a commonplace, and there is no intrinsic difference in the two. That unconscious resistances to the idea of pregnancy can hinder conception is now suggested by physiological evidence, and the cases quoted by Dr. Deutsch strongly support such findings from the psychological angle. She is at her best when discussing purely psychological situations—the relations of stepmothers and stepchildren, of man and wife, of foster-mother and adopted child, and the adjustments which all women must make at the climacteric. With her evidently wide experience, and her insight into conscious and unconscious mental processes, she sheds many a sharp beam of light on human antics, and sets the reader thinking on rewarding lines. She brings home with uncommon force the great variety of things people do, and more especially the things they do, willy-nilly, to their children. Again and again the grown person tries to act out with her mate or her children some situation from her own childhood which left her dissatisfied; and of course the same is true of men. Carrying so much bias for disaster as we do, the wonder is not that few achieve the ripeness which is all, but that any do; and perhaps even these have more often to thank the benign patterns of a healthy soma than the wisdom and virtue of a mature psyche. Dr. Deutsch is good at pointing out those aspects of the psyche which most commonly fail to ripen.

Urologic Roentgenology (2nd ed. London: H. Kimpton. 1946. Pp. 259. 27*s*. 6*d*.).—This compact little book by Dr. M. B. Wesson, ex-president of the American Urological Association, was originally written for radiologists and physicians interested in urology. There have been great technical advances since the first edition, and the extensive use of intravenous pyelography now demands some knowledge of interpretation from all members of a hospital staff. All the abnormalities and diseases of the genito-urinary tract are adequately described, but special emphasis is laid on the commoner ones. The illustrations are liberal and excellent, and the text is so well written that it is a pleasure to read.

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THE LANCET

LONDON: SATURDAY, DEC. 6, 1947

Advisers of the Boards

SURPRISE will have been felt in many quarters at last week's advertisements in our columns for whole-time psychiatrists to certain of the regional boards. What is to be their function, and are these appointments to be followed by similar ones for other specialties? If so, where is the process to end?

The general expectation had been that whole-time professional appointments to the regional headquarters staff would be limited to the chief administrative officer—with perhaps one or two subordinates acting as his assistants—and that he would be concerned with administrative rather than professional matters. The simultaneous appearance of advertisements from several regions suggests that the move in a new direction originated from headquarters in the Ministry rather than by local initiative. If psychiatrists are needed to help with the immediate office work at regional headquarters, it might have been supposed that they would be part-time advisers already holding key positions in the psychiatric service in the region. The present proposition is quite different; for the new posts are permanent and whole-time, and carry salaries second only to those of the chief administrative officers themselves. In the absence, therefore, of any official statement explaining the purpose of these appointments it seems fair to assume that an important principle is at stake. The tendency they imply might easily lead to a form of "officialism" very far removed from the hopes of many who have warmly supported the regional idea. A primary object of the proposed organisation, as we understood it, was to give the regional boards the benefit of advice and guidance from the best medical opinion in the region; and though it is true that no specific provision is made by the Act for medical advisory committees to the boards, the consequences of a failure to establish such machinery would be serious. We cannot now afford to dispense with an arrangement which has been handed down to us in the best traditions of the voluntary hospitals. And if there is anything about which the medical committee of a hospital has a right to be sensitive, it is the making of whole-time appointments to key positions without any reference to it.

We are here in deep water, and it is surely time to look again at first principles. Many of the questions that the boards will have to consider will be closely analogous to those that confront the individual voluntary hospital. The relative priorities of this or that branch of medicine and their claims on the available resources will need to be debated. Sooner or later the whole of the medical staffing in the region will have to be revised, and all kinds of new appointments made. How are these matters to be discussed and settled? Either the board can settle these things itself, relying on the advice of its chief administrative officer and of those of its own members who happen to be medical men; or it can appoint properly constituted medical advisory committees representative of all the various interests in the region, and take the advice of their accredited representatives before reaching its own decisions. Surely these alternatives have only to be clearly stated for it to be obvious that the latter method is the right one. If then the need for medical advisory committees is clear, is it wise at this early hour to appoint whole-time specialists on the lines indicated in the recent advertisements, before the medical advisory machinery has had a chance to function? For what whole-time specialist, once attached to the staff of the board as its privileged adviser, is going to look with favour on the establishment of an advisory committee by which his advice will be criticised? If this path is followed it is only too probable that all hope of the evolution of satisfactory medical committees for the region will die away.

Progress in Cancer Research

A PICTURE in *Nature*[1] of some little white balls, 200 A in diameter, lighted on one side and casting a shadow on the other, together with the caption that they were derived from lactating tissue of high-cancer-strain mice, provoked from the uninitiated the query "Are these really the cause of cancer?" This question was discussed at a meeting of the Royal Microscopical Society on Nov. 19 and it seems that we still do not know the answer—unless perchance it can be supplied by the editor of *Life*, in whose pages appear the only available picture and account of similar particles obtained in similar studies in the United States.[2]

Previous biological tests showed that milk, tumours, blood, and some normal tissues derived from high-cancer strains of mice contain an agent which under certain specific conditions can produce mammary tumours. When water extracts of such material were spun at high speed they yielded a deposit, including this agent, which was thought to consist of very small particles. Professor PASSEY and his associates at Leeds set out to determine whether these particles could be rendered visible by electron microscopy and whether any of the particles which appear in photographs represent the active extractable agent. By a suitable technique clear-cut pictures of rounded particles 200 A in diameter were eventually obtained from, and only from, milk and tissues of high-cancer lines. At the Royal Microscopical Society's meeting the investigators met criticisms in respect of the size and shape of the particles and the treatment of the extracts, but they did not claim finality or even satisfaction. They are handicapped by having only the occasional use of an elderly temperamental instrument from which too much is being asked, and extraneous difficulties are always hard on biological studies, which impose their own exacting conditions. Hence progress has inevitably been slow. Nevertheless if these particles are the agent, in single units or conglomerations, it is a big advance to show that they can be displayed by electron photography.

1. Passey, R. D., Dmochowski, L., Astbury, W. T., Reed, R. *Nature, Lond.* 1947, 160, 565.
2. *Life*, July 21, 1947, p. 68.

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Are these now visible particles in fact the agent we are looking for? Certainly their absence from cancer-free strains makes them worth pursuit, and the Leeds team is proposing to ascertain whether they can be found in the tissues of strains which lack the agent though they have similar hereditary characters. It is of great interest to hear that the particles are absent also from mammary tumours induced by chemical carcinogens, which suggests either that they are not extractable from, or that they are not present in, the original tumours. The next step is to discover whether they are viable and capable of producing tumours when reinjected into suitable mice: instead of being the agent itself they might be a product of its presence. Inquiries into these problems will not be complete for some months, and even then a negative result will not be final, since the process of extraction might itself destroy tumour-producing potency. Meanwhile PASSEY and his colleagues may be encouraged by the similarity between the appearance of their small particles and that of the larger known animal viruses—a similarity which so experienced an observer as Dr. MERVYN GORDON considers significant.

This work is referred to in the 24th annual report of the British Empire Cancer Campaign,[3] from which it is clear that many long-standing problems have been solved or are nearing solution. For example, a source of naturally occurring carcinogens has long been sought. It was thought at one time that these might be formed in the liver, since extracts could be made of this organ, whether cancerous or not, that produced sarcomas on injection into animals. It now seems from Dr. I. HIEGER's work that cholesterol-rich fractions of the unsaponifiable part of various tissues contain the responsible agent. Commercial cholesterol, which is impure, is sometimes carcinogenic. Purer cholesterol has been prepared, and is next to be tested to determine whether it is itself carcinogenic. The same end is being pursued by Prof. F. DICKENS, F.R.S., from another angle, in the formation of aromatic-ring structures by intact living cells. The inhibition of growth by carcinogenic growth-promoting chemicals has been shown by Dr. L. A. ELSON to depend on the nutrition of the animal. A diet sufficiently high in protein reduces or neutralises the inhibitory action.

Since radiotherapy was first introduced a controversy has been carried on as to the mode of action of the rays. Some fifteen years ago it was hotly denied by many that indirect action caused the death of either normal or malignant cells under proper conditions of irradiation. The present report acknowledges in many places an indirect action on the tumour bed, as the vascular connective-tissue is now familiarly but inaccurately called. In well-devised experiments Dr. I. LASNITZKI has computed that at the surface of tumour tissue the direct effect accounts for about one-third and the indirect effect (ascribed to vascular damage) for two-thirds of the total lethal effect. The attention shown by various authors to radionecrosis, to necrosis in normal brain irradiated in the process of treating cerebral tumours, and to protection of Haversian canals in bone all point to a recognition of the sensitivity of parts at least of the vascular system to damage by irradiation. It is perhaps not inopportune to suggest that the whole of this damage cannot be demonstrated by histological methods, and to inquire what, for example, may be the effect in the brain of protracted stasis of blood in vessels which nevertheless do not subsequently undergo gross structural damage.

Dr. F. R. SELBIE has now succeeded in transmitting the Shope papilloma virus to its 9th passage in domestic rabbits. This has been done with the aid of contaminating micro-organisms; but just which ones are responsible has yet to be decided.

If the price of liberty is eternal vigilance, the Campaign has set an example to us all. As mentioned at the annual meeting reported on p. 847 the campaigners have had the forethought to obtain from the Minister of Health an assurance that the control of their resources is to remain unaltered. The report reveals that work is fast gathering way. In the past year a *British Journal of Cancer* has appeared; a grant of £25,000 has been allotted for intensification of virus research in cancer; and, best of all, the number of new names among the staffs of the various centres suggests that there is some more young blood in circulation.

Child Guidance

WHERE should maladjusted children get their treatment? Is child guidance a branch of general psychiatry or a specialty in its own right? Is it more properly allied to pædiatrics, or does it belong to education as part of modern educational psychology? Inherent in the child-guidance movement are tensions derived from the traditional element of competition between doctors, teachers, and the Church—all seeking to influence the mind of the young. Child guidance, however, owes its existence to the principle of partnership between psychiatrist, educational psychologist, and psychiatric social worker, with each member of the team playing the leading part in his appropriate field. When first achieved, this harnessing in unity of potentially divergent forces was unique in medical relationships, and it remains the main strength of the movement. As the Royal Society of Medicine was reminded at last week's meeting (see p. 833), it was worked out from first principles by the non-medical wife of a Chicago banker interested in juvenile delinquency. With this dubious origin, child guidance has been regarded with equal suspicion by orthodox medicine and by the teaching profession, and it has been developed by individuals somewhat outside the main streams of their professions. But with success has come recognition and a desire for adoption.

Of public bodies, education has so far given child guidance most support, and today more than 80% of clinics work under the local education authority, either directly or (less commonly) indirectly by an arrangement with the local health authority, the normal administrative machine being the School Medical Service. With two or three notable exceptions the mental-health services have not undertaken child guidance, except in so far as some mental hospitals accept children in their outpatient departments. About 15% of clinics belong to general hospitals, and lately there has been a welcome tendency

3. British Empire Cancer Campaign: Twenty-fourth Annual Report, 1947. Issued from 11, Grosvenor Crescent, London, S.W.1.

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for children's hospitals to establish them. It would be a mistake, however, to shape our plans for the future in accordance with present experience of the sources and types of children treated; for in an area which is exceptionally well served only two-sevenths of the modest requirements laid down by BLACKER[1] and others are met. Until a service is nearly adequate, sampling by clinic records is quite arbitrary, because the case-load of a clinic is quantitatively and qualitatively merely a reflection of the reputation, interests, and capabilities of the clinic's staff. Another principle to be observed in planning is that first consideration must be given to the interests of the children and their parents rather than to any popular administrative doctrine such as the contemporary urge for unification.

The solution proposed by BLACKER and supported in a Nuffield Provincial Hospitals' Trust report[2] is that child guidance should be undertaken at centres controlled by the education authority, where mainly educational problems would be dealt with by a psychologist, and from which children deemed to be psychiatrically ill would be sent to clinics under the health authority, where a psychiatrist would preside. With its obvious administrative convenience, this proposal is approved by some educationists and mental-hospital authorities; but it is opposed by the Child Guidance Council (now merged with the National Association for Mental Health), which stands for the team principle. Objections raised to the scheme are that, in applying the ominous political device of partition, it depends for success on a mutual tolerance not always evident except where the working bond is close, and that it presupposes among educational psychologists a state of clinical experience which seldom exists: it entrusts to untrained persons the difficult task of recognising psychiatric illness among school-children, while the psychiatrist, against the trend of modern psychiatric practice, retreats once more to his clinical castle. Although this does not apply to the authors of the present proposals, similar schemes in the past have derived some support from a refusal to recognise the full implications of emotional disturbances in children, with a consequent desire to establish a cordon sanitaire to protect maladjusted children from psychiatrists unless all else fails. This may even take the form of a standing committee whose function is to review reports from all possible sources before agreeing to send a child to a clinic. Another escapist argument is that most children's maladjustments may be satisfactorily dealt with by the light of nature and that psychotherapy is little more than applied common sense. But common sense, and persuasiveness, are common among those who handle children, and they will continue to fail where it is necessary to face the deeper emotional issues.

At first sight, the obvious place for child psychiatry is with the mental-health services; but child guidance is far wider than child psychiatry, and even the latter has derived comparatively little from the study of adult problems. Again, public opinion is not such that the prevention of children's maladjustments will thrive on close identification with adult psychiatry; the change in name from Mental Hospital Services to Mental Health Services has yet to be associated with an equal change in orientation, and mental hospitals have contributed little to the understanding of the difficult child. Recent experience, moreover, has shown that psychiatry is most effective when nearest to the problem as it occurs in life. Modern child guidance comprises work in maternity and child-welfare clinics; in schools, by selection and grading of pupils and by special teaching methods; in foster-homes, boarding homes, and residential schools; in children's hospitals, notably orthopædic and fever; and finally in diagnosis, disposal and treatment, at the clinic itself, in work in the home, and in the provision of special hostels for treatment. The authorities concerned in all this will include regional hospital boards, local health authorities, local education authorities, and the Home Office, and we should recognise that the first-named has no pre-eminence of interest: indeed the highest common factor, as it were, is the local education authority, which of all public bodies now has far the most intimate concern for the mental and physical development of children between the ages of 2 and 18. It seems logical, therefore, for the great preventive mental-health service of childhood to remain an integral part of that system, and there seems to be no paramount administrative reason for changing the existing arrangements by which child guidance is administered by the School Medical Service, which is itself intermediate between the education and the health interests. Thus placed, the child-guidance services can be linked through the School Medical Service with hospitals and specialists, and particularly with pædiatrics; and there is no reason why the psychiatrists employed in this work should not be carried on the establishments of regional hospital boards. Both the medical and the educational aspects of child guidance should be under the unified control of experienced clinicians, and the operations of educational psychologists in the schools should be firmly based on the clinical team; though this does not mean that the psychiatrist must necessarily be the administrative head of the service. In addition there is every reason for general and psychiatric hospitals to develop their own departments of child guidance so that psychiatric principles may permeate medical teaching, so that research can be undertaken, and so that patients can readily be given any special form of treatment they may require.

Despite the demand, however, there may be no future in this country for child guidance unless the supply of clinically trained workers of all disciplines is radically increased. This is not a matter of giving courses of lectures and of amending the regulations for diplomas, but of providing clinical experience in therapy under the supervision of those who are qualified to teach. Concentrated courses of a few months give time neither to absorb the subtleties of treatment nor to learn about children at home and at school. Diagnosis and disposal can be learnt fairly easily, but to acquire therapeutic skill needs long-continued practice under supervision. In the shortage of adequately trained therapists, competent and willing to treat difficult cases, lies the most dangerous threat to child guidance.

1. Blacker, C. P. Neurosis and the Mental Health Services, London, 1946.
2. Appendix to a report on the planning of hospital services in the Berks, Bucks, and Oxon region, Nuffield Provincial Hospitals Trust, 1947; see *Lancet*, 1947, I, 421.

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Rickettsial Pox

DURING the summer of 1946 an outbreak of an unusual infection occurred among the 2000 inhabitants of a housing estate in one of the boroughs (Queens) of New York City and was investigated jointly by the New York Department of Health and the U.S. Public Health Service. Although cases were noted sporadically in the early months of the year, it was not until July that the outbreak reached such proportions as to attract special attention. During the first six months of 1946 there were 124 recognised cases (6·2% of the total population), distributed over a wide age-group (from three months to seventy-one years); males and females were affected equally and no occupational relationship could be established.

Clinically [1] the infection was characterised by a primary skin lesion in the form of a papule; this soon developed into a deep-seated vesicle with surrounding erythema and later shrank to a black eschar which disappeared after about three weeks, leaving in most cases a small scar. The lesion was usually found on some covered part of the body and was often accompanied by some regional adenitis but no lymphangitis. About a week after the appearance of the initial lesion an acute febrile illness began, with fever, chills, sweating, headache, and backache—not unlike an influenzal attack but accompanied at the onset or within two days by a maculopapular rash which a day or two later became vesicular and then crusted and which disappeared in four to seven days without scarring. The intensity and distribution of the rash varied considerably, lesions being sparse to abundant and appearing sometimes on the limbs and sometimes on the trunk, but never on the palms or soles. The patients were not acutely ill; they remained alert and coöperative and showed little loss of appetite. There were no distinctive physical signs apart from the rash, and all the patients recovered without complications. Blood-culture and the usual serological tests were all negative; 21 out of 22 patients on whom blood-counts were done showed a leucopenia. The disease most resembled chickenpox and was so diagnosed initially, but the deep-seated vesicle and the lack of any characteristic distribution of the rash, together with the greater constitutional upset and the wide age-distribution, served to distinguish it. Specimens of blood from 15 patients were inoculated into animals, and from 1 out of 5 mice which received blood taken from a patient on the second day of fever an organism with the morphological, cultural, and staining characteristics of a rickettsia was isolated.[2] This rickettsia after primary isolation produced lesions in the guineapig, including well-marked scrotal reactions. It also produced lesions in the chick embryo, and an antigen prepared from the infected yolk sac was used to demonstrate the presence of complement-fixing antibody in the sera of convalescent patients: the same sera reacted less strongly with a Rocky Mountain fever rickettsial antigen. This serological cross-reaction, together with its behaviour in the chick embryo and the guineapig, suggested a relationship between the new rickettsia and *R. conori*, the causal agent of fièvre boutonneuse, but there seem to be some clinical and serological differences between the two infections.

Meanwhile the epidemiologists were establishing the source of the infection.[3] The only insect or animal parasites that were noticeably present in the infected blocks of houses were mosquitoes (*C. pipiens*) and mice. The mosquitoes were exonerated. The mice, it was discovered, were breeding in the basement incinerators, which for want of sufficient attendants were not being regularly fired and were therefore collecting refuse on which the mice fed and bred and from which they invaded various apartments. At the same time mites, often gorged with mammalian blood, were discovered, sometimes in great numbers, on the mice, on the walls of the incinerators, and in various living-rooms. From two pools of these mites the same rickettsia—now called *R. akari*—was isolated, and it was also demonstrated, together with specific antibody to it, among the mice.[4] There was a good correlation between mite infestation and clinical cases of rickettsial pox in the houses that were carefully examined. The mite is probably the natural vector of this new rickettsia, and the mouse is the usual animal reservoir; but obviously when occasion offers the mite and the rickettsia are prepared to venture into pastures new, and so another rickettsial infection has been born.

1. Greenberg, M., Pellitteri, O., Klein, I. F., Huebner, R. J. *J. Amer. med. Ass.* 1947, **133**, 901.
2. Huebner, R. J., Stamps, P., Armstrong, C. *Publ. Hlth Rep., Wash.* 1946, **61**, 1605.
3. Greenberg, M., Pellitteri, O., Jellison, W. L. *Amer. J. publ. Hlth*, 1947, **37**, 860.
4. Huebner, R. J., Jellison, W. L., Pomerantz, C. *Publ. Hlth Rep., Wash.* 1946, **61**, 1677.

Annotations

HYPERTENSION AND HEREDITY

CLINICIANS have long been convinced of the significance of a positive family history in assessing the prognosis of patients with hypertension. Hitherto this has been little more than a clinical impression, though it is more than fifty years since Riva-Rocci[5] published his article on sphygmomanometry, and forty years since Gibson [6] made his classical report on the same subject. Three factors may be held mainly responsible for this anomalous state of affairs. In the first place, only of late years has there been anything like agreement on what constitutes hypertension, and even today the agreement is almost as tenuous as that of a council of foreign ministers. The second factor is our lack of knowledge concerning the ætiology of essential hypertension, and the consequent inclusion under this generic title of a variety of conditions which are only now being gradually sorted out. For example, the importance of renal disease, apart from nephritis, has only recently been appreciated: Weiss and Parker[7] have claimed that at least 15–20% of cases of so-called malignant hypertension are due to chronic pyelonephritis, whilst Wosika and Maher,[8] by urological investigation, found that among 600 cases of hypertension 29% were secondary to demonstrable renal causes. The third factor is the difficulty of obtaining an adequate and reliable family history.

It is thus clear that any attempt to establish statistically a hereditary factor in hypertension is fraught with pitfalls, and Platt[9] was undoubtedly right to study a series small enough for personal investigation, and yet large enough to permit of statistical analysis. Only patients with symptoms referable to hypertension were included in his series; the lowest systolic pressure

5. Riva-Rocci, S. *Gazz. med. Torino*, 1896, **47**, 981.
6. Gibson, G. A. *Quart. J. Med.* 1907, **1**, 103.
7. Weiss, S., Parker, F. *Medicine, Baltimore*, 1939, **18**, 221.
8. Wosika, P. H., Maher, C. C. *Urol. cutan. Rev.* 1939, **43**, 815.
9. Platt, R. *Quart. J. Med.* 1947, **16**, 111.

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recorded is 170 mm. Hg, while the lowest diastolic pressure is 100 mm. Hg. Of the 116 patients in the series, 78 had essential hypertension (61 benign, 17 malignant), 4 were probably examples of benign essential hypertension, and 18 had secondary hypertension; in the remainder the cause of the raised blood-pressure was uncertain. The cases were divided into four groups according to family history: group 1 comprised those in which one or more parents had hypertension; group 2 those in which there was a probability of this; group 3 those in which there was no definite evidence one way or the other; and group 4 those in which the evidence was against hypertension in either parent. The control group consisted of 71 unselected patients over the age of thirty with no history of hypertension. Analysis showed that in approximately 76% of cases of essential hypertension there was a family history suggestive of hypertension, while in only 6·4% was the family history negative. In the 38 patients with secondary hypertension a family history of hypertension was obtained in only 34%, and there was no evidence of such a history in 42%. The corresponding figures for the control patients over the age of forty were 36% with, and 35% without, a family history of hypertension. As Platt points out, if essential hypertension is inherited by a simple mendelian dominant transmission, family history should always be positive. He has therefore reviewed the 5 cases in which family history was apparently negative, and in only 1 of these was it impossible to find some factor which threw doubt on the diagnosis of essential hypertension. Whilst absolute evidence is still lacking, this investigation, particularly when taken in conjunction with the findings of Ayman[10] and of Weitz,[11] goes far towards establishing the hypothesis that essential hypertension is a hereditary disease conveyed as a mendelian dominant with a rate of expression of more than 90%. Whether the inherited factor is specific for hypertension or is merely a tendency to arteriolar change is a question requiring further investigation.

STREAKY BLOOD FILMS

IT is a sad fact that human curiosity is least stimulated by the things which happen most often. There are, for instance, so many blood films in the hæmatologist's life that he accepts their physical vagaries with automatic irritation. The well-known product consisting apparently of a "drop of semi-clotted blood worried across the dirty surface of one slide by the jagged end of another" he rightly ascribes to bad technique, but the strange predilection of the polymorphonuclears for the edges of the film he regards with resignation. It is refreshing, therefore, to find Boveri, Waterfield, and Newman, whose preliminary report appears in this issue, tackling scientifically that other familiar annoyance, the blood film which, despite immaculate technique, dries in streaks. On coming to grips with this problem they were at first impressed by a correlation between such streakiness and a high erythrocyte-sedimentation rate of the blood from which the films were made. However, rouleaux did not necessarily occur in the ridges of red cells forming the streaks, and not all patients with a high E.S.R. showed the phenomenon, in spite of obvious rouleaux in their films. Further investigation revealed the probable causal factor as a raised blood-fibrinogen level, which often, but not always, accompanies a raised E.S.R. Blood films in such conditions as uncomplicated anæmia or myelomatosis, in which the fibrinogen content is normal but the E.S.R. raised, showed no streakiness. The obvious possibility that the ridges were due to some partial or impending coagulation of fibrinogen was ruled out by the occurrence of streakiness in oxalated or citrated blood. Moreover, the addition of traces of bile-salts, with a consequent lowering of the surface tension, abolished the ridges. It was finally observed that films made from plasma alone showed a wavy surface when examined while still wet if the plasma was derived from blood giving streaky films, while serum always produced smooth films.

The streaky film is of clinical importance since it may afford a simple and rapid method of demonstrating a significant increase in blood-fibrinogen, which, unlike the E.S.R., is not affected by anæmia. These observations of the physical behaviour of fibrinogen under certain conditions of concentration and surface action may also throw light on the more academic problems of blood-clotting. Finally there is the moral that an insatiable curiosity about the common little events of everyday life is a gift valuable to the systematic investigator.

10. Ayman, D. *New Engl. J. Med.* 1933, **209**, 194.
11. Weitz, W. *Z. klin. Med.* 1923, **96**, 151.

BOVINE TUBERCULOSIS

THE present organisation of our universities, and of our local and national services, does not favour close collaboration between the medical and veterinary professions: in spite of occasional exhortations about the importance of comparative pathology, it is an unfortunate fact that medical and veterinary pathologists usually work quite separately. It is therefore all the more encouraging to find someone who has taken the lesson to heart and has endeavoured, in a subject of such major interest as bovine tuberculosis, to make a comparative study of the disease in man and cattle, and to present his results in the form of a comprehensive and eminently readable review.[1]

Mr. Francis has collected information from many different countries, and has provided useful figures on the incidence of tuberculosis in cattle and on the extent to which control measures have proved effective. He suggests that, in Great Britain, tuberculosis did not become common among cattle till the introduction of town dairies, which developed with the growth of the manufacturing centres during the latter part of the 18th century. The conditions under which the animals were kept in these dairies were deplorable, and it is not surprising that by the middle of the 19th century about 20% of cattle examined in Durham were found post mortem to be tuberculous. The most recent figures, based on tuberculin tests, lead to the conclusion that about 20% of all *cattle* in England, 7·5% in Wales, and 14% in Scotland are infected with the tubercle bacillus. For Great Britain, as a whole, about 17–18% of *cattle* and 30–35% of *dairy cows* react to the tuberculin test. The incidence of udder tuberculosis is estimated to be about 0·5% for all cows and 1·5% for tuberculous cows. There is reason to believe that the incidence of bovine tuberculosis has altered little during the last fifty years. The economic loss due to this disease in cattle alone is estimated to be £1–3 million per annum.

Contrasting the disease in man and animals, Francis points out that infection of cattle is mainly aerogenous and affects primarily the lungs, whereas infection of man with the bovine type of bacillus is mainly attributable to drinking milk and affects primarily the extrapulmonary tissues. Except in infants, tuberculous infection of man results usually in a lesion that retrogresses and eventually heals. In cattle, on the other hand, infection, once it has occurred, tends to be progressive. Hence a positive tuberculin reaction is of far greater significance in cattle than in man. Indeed Francis says that, since pulmonary lesions in cattle seldom heal, and since they usually extend by the

1. Bovine Tuberculosis: including a Contrast with Human Tuberculosis. JOHN FRANCIS, B.SC., M.R.C.V.S., Imperial Chemical Industries Biological Laboratories, Wilmslow, Cheshire. London: Staples Press. 1947. Pp. 220. 25*s*.

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bronchial route, nearly all tuberculin-positive animals may be regarded as infective for others. In the control of bovine tuberculosis, he believes that pasteurisation of milk affords the only hope of immediate benefit to the human population, and that the eradication method based on the tuberculin test is the only satisfactory policy for dealing with the disease in cattle. He draws attention to the fact that, except for tuberculosis, Great Britain has led the way in stamping out the major zymotic diseases of animals—rinderpest, pleuropneumonia, sheep-pox, rabies, and glanders—and he thinks that the time has now come to make a determined attempt to get rid of tuberculosis. If the rate of progress reached just before the war in the eradication scheme is maintained, he estimates that all British cattle will be in attested herds in about 40 years' time.

STAIN REACTIONS IN ERYTHROID CELLS

THE visible changes in the reaction to various stains are everywhere used to differentiate cells and to assess the stage of their development. There is today general support for a modified monophyletic view of blood-cell development, postulating that most, but not all, cells derive from a common basophilic precursor, the hæmocytoblast. In erythroblasts, whether normal or pathological, the original basophilia of the cytoplasm pales as development proceeds, and then changes, through grey-blue stages, to the pink of the erythrocyte. The nucleus has nucleoli in the earliest (pro-erythroblast) stage, but loses them in the later stages. During the final collapse and pyknosis of the nucleus separated fragments often appear while the nucleus is still present, and many persist as inclusion or Howell-Jolly bodies after the nucleus itself has entirely disappeared.

New light on both the disappearance of cytoplasmic basophilia and the nature of the so-called inclusion bodies has been provided by the use of recently developed cytochemical techniques. Brachet [1] described a cytochemical test for ribonucleic acid which depends on the use of a ribonuclease discovered by W. Jones in 1920 and further explored by Kunitz.[2] The enzyme depolymerises ribonucleic acid, but has no action on deoxyribonucleic acid; and it is the latter which is responsible for the Feulgen reaction that stains nuclear chromatin. Brachet found that the basophilia of the young cells in the bone-marrow of various animals was removed by ribonuclease, and he deduced that the presence of ribonucleic acid accounted for the tint. This reaction has been applied by White [3] to human bone-marrow material, both normal and pathological, obtained by sternal puncture. The marrow films are fixed with Susa solution and then stained with pyronin-methyl-green; this colours bright red the cytoplasm that appears basophilic with the usual Leishman or Jenner-Giemsa stain, and the degree of red stain corresponds to the deepness of the basophilia; the stain also colours nucleoli red. The chromatin of the nucleus takes up the methyl-green. Hæmocytoblasts and all early erythroblasts show red-staining cytoplasm and nucleoli when present. If the marrow films are exposed to the action of ribonuclease before staining, then the nucleoli and the cytoplasm fail to take the pyronin stain. Early normoblasts and megaloblasts show decreasing basophilia as hæmoglobinisation increases; this is paralleled by a decrease of the pyronin-staining material that is removed by ribonuclease. There is thus good evidence that the cytoplasm of early erythroblasts contains ribonucleic acid, and that this is the substance responsible for their basophilia. As development proceeds, ribonucleic acid becomes less and hæmoglobin increases in the cytoplasm, these two changes being reflected in the change from basophilia through polychromatic stages to the pink colour of the mature red cell. Myeloblasts can also be shown to contain ribonucleic acid in their cytoplasm, and the concentration decreases as the cells mature into myelocytes.

La Cour [4] has applied the Feulgen reaction for deoxyribonucleic acid to dividing erythroblasts seen in the bone-marrow of patients with pernicious anæmia. He noted that the chromosomes of pro-myelocytes have only a low charge of deoxyribonucleic acid as compared with the pro-erythroblasts. There were other mitotic abnormalities, and La Cour suggested that the granulocyte abnormalities in pernicious anæmia might be due to the lack of deoxyribonucleic acid because the pro-erythroblasts take the lion's share of a short supply. This is interesting, and it links up with the suggestion that folic acid is concerned with nucleic-acid metabolism. But La Cour's observations were made on 2 patients only, and it is not clear that the different kinds of cells were adequately differentiated; nor were hæmoglobinised megaloblasts seen in mitosis.

The fact that inclusion bodies are sometimes to be found in red blood-cells has been known for a long time, and it was also known that they were particularly liable to appear and persist after splenectomy or even atrophy of the spleen. These were the Howell-Jolly bodies; they stained a reddish-purple with Leishman or Giemsa, which distinguished them from the grey or black dots of punctate basophilia. The Feulgen reaction shows that the Howell-Jolly bodies are nuclear fragments; the bodies of punctate basophilia are not. In 1945 Pappenheimer and others [5] reported the appearance of inclusion bodies in the red cells of 3 patients whose spleens had been removed for anæmia of probable hæmolytic type. The bodies were rounded and often multiple; they did not give the Feulgen reaction and so were not Howell-Jolly bodies. They did react with potassium ferricyanide and hydrochloric acid, thus showing that they contained iron. Now iron-containing erythrocyte inclusions had been described by Grüneberg in mice and human subjects and named "siderocytes"; they were thought to be red cells nearing the end of their life, with free iron already splitting off from the hæmoglobin. Pappenheimer and his colleagues thought that their cells might well be siderocytes, but they offered no explanation for their appearance. Recently McFadzean and Davis [6] in Glasgow have reported iron-staining erythrocyte inclusions in patients with acquired hæmolytic anæmia, and the number of affected cells rose to 60–80% after splenectomy. These bodies gave reactions like Pappenheimer's bodies; they were Feulgen-negative but gave a positive iron reaction; they were mostly rounded but some had bizarre shapes and were quite large. Investigation of the marrow showed that normoblasts, even when not fully hæmoglobinated, were affected; sometimes 70–80% of these cells contained inclusions. It was noted, too, that the proportion of normoblasts with cytoplasmic inclusions was about the same before splenectomy as after. McFadzean and Davis therefore suggested that the red cells deriving from affected normoblasts are unusually susceptible to destruction in the spleen, and that splenectomy enables many more of them to survive in the peripheral blood-stream. They also think that affected red blood-cells in their patients resemble Grüneberg's siderocytes, but hold that interference with hæmoglobin anabolism, rather than breakdown, is responsible for their appearance. These recent reports suggest that some of the earlier descriptions of Howell-Jolly bodies increasing after splenectomy really referred to these ferruginous non-nuclear bodies. Their significance

1. Brachet, J. *C.R. Soc. Biol. Paris*, 1940, **133**, 88 (quoted by White).
2. Kunitz, M. *J. gen. Physiol.* 1940, **24**, 15.
3. White, J. C. *J. Path. Bact.* 1947, **59**, 223.
4. La Cour, L. F. *Proc. roy. Soc. Edin.* B, 1944, **62**, 73.
5. Pappenheimer, A. M., Thompson, W. P., Parker, D. D., Smith, K. E. *Quart. J. Med.* 1945, **14**, 75.
6. McFadzean, A. J. S., Davis, L. J. *Glasg. med. J.* 1947, **28**, 237.

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is still not known. They are not limited to hæmolytic anæmias; the Glasgow workers reported them in several other anæmias including pernicious anæmia, but they are not then so numerous.

Of the two groups of staining-reaction studies discussed here, the one dealing with ribonucleic acids seems to be, so far, the most likely to add to our knowledge of the physiology and pathology of erythropoiesis. They both show that interest in staining reactions is far from dead; and with new or differently applied techniques, fresh information about their significance is emerging.

THE MAKE-UP OF THE ALCOHOLIC

IT is so much easier to blame the alcoholic than to study him dispassionately that for long the only treatment of his condition was by exhortation. Dr. A. E. Carver, in a lecture [1] to the Society for the Study of Addiction on Oct. 21, argued that alcoholism, like other addictions, must be considered as expressing a failure of adjustment of the personality as a whole, and not as due either to moral dereliction or material disease. Behaviour, he pointed out, in both its physiological and psychological aspects, is always an attempt of the individual to adjust himself to his environment. When he fails he seeks some situation, or some substance, to restore the balance. Some drugs relieve distressing symptoms, and, if his anguish is severe, a patient is likely to take them without pausing to consider or correct the underlying disorder. If the disturbance is transitory the drug will tide him over; if not, the drug will in time cause its own symptoms. Even a euphoriant with none of the disadvantages of alcohol would merely bring the doctor into competition with the publican, without curing the patient.

Dr. Carver makes an interesting comparison, from the psychosomatic aspect, of alcoholism with asthma. In both he recognises a constitutional trend associated with psychological factors. In asthmatics, "the vago-insulin component of the autonomic system preponderates over the sympathetico-adrenal partner." Hence the bronchial mucosa is hypersensitive and liable to react to irritations which do not upset ordinary people. But the sensitivity varies; there are periods of complete freedom for the asthmatic, just as there are for the dipsomaniac.

> "An asthma personality," Dr. Carver says, "seems to be so constituted as to enable him to use as detonator . . . a multitude of substances and situations which nature has ready to hand in profusion; whereas the alcoholist . . . cannot attain the end after which his being is striving unless his tissue reactions are modified by one particular substance. . . ."

But the fact that a constitutional factor is present does not entitle the doctor, Dr. Carver thinks, to adopt a fatalistic attitude, or the patient to sit back in the complacent belief that he is made that way.

There are also reflex factors in both diseases. Thus the alcoholic experiences reflex irritations—for example, the "aching void" in the stomach at opening time—which drive him to take a drink; while asthmatic attacks may be reflexly provoked by causes in the respiratory or other bodily systems. Psychologically, the alcoholic is sensitive, touchy, and self-indulgent, with strong inferiority feelings, while the asthmatic is intelligent, irritable, aggressive, quick to respond, but also over-anxious and insecure. The asthmatic child makes great demands on his mother, being intelligent enough to get his own way and anxious enough to exact continual attention. It may reasonably be argued, Dr. Carver suggests, that it is just as "sinful" to take air to excess as to take alcohol to excess. "The creature as a unity reaps the consequences." What should interest the doctor are the reasons which impelled the creature to such inadequate behaviour; and treatment should be directed to helping him "to face reality, and if possible to attain his legitimate wishes by more adequate and socially acceptable means."

1. Published in the *British Journal of Addiction*, October, 1947.

FATAL POISONING WITH AMINOTHIAZOLE

THE antithyroid substance aminothiazole, one of those introduced by Astwood in 1943, was studied in France by Perrault and Bovet,[1] who found that its toxicity in mice was relatively low, though fatal poisoning might result from a cumulative effect. They observed no blood changes, cyanosis, jaundice, or albuminuria in patients receiving the drug for thyrotoxicosis; but Himsworth and Morgans,[2] who treated 13 thyrotoxic patients with aminothiazole, found a considerable reduction of the granular cells in 5 cases, and in their view the drug is far more liable to produce toxic reactions than thiouracil. The complications noted in patients receiving 0·6 g. daily included drug fever, rashes, enlarged lymph-glands, toxic jaundice (2 cases), nausea and vomiting, and halitosis.

The first fatal case of poisoning with aminothiazole in human beings has lately been reported by Schwob and others [3] in a woman of 33, not thyrotoxic, who tried to procure abortion by taking fifty tablets, each containing 0·1 g. of aminothiazole. A few hours later she vomited, and she did so again next day, when her menses reappeared. She consulted several doctors, who put her on a milk diet and gave her some sedatives. On the third day she developed a headache, which rapidly got worse. She was then given insulin, and her vomiting ceased; but she soon lapsed into unconsciousness, with extreme restlessness and occasional spasms of opisthotonos, culminating in coma and death. Laboratory investigations revealed uræmia and hypocalcæmia, and the necropsy showed hepatitis and nephritis. The thyroid contained localised zones of congestion and necrosis. There was no agranulocytosis. The patient weighed about 55 kg., making the lethal dose a little less than 0·1 per kg. (ignoring elimination by vomiting).

In a non-fatal case of poisoning recorded by Gaultier [4] the aminothiazole was again taken in an attempt to procure abortion. A healthy woman of 26 took nine tablets at 8 A.M., noon, 4 P.M., and 9 P.M., making a total of 3·6 g. in thirteen hours. About midnight she began to vomit and she did so repeatedly through the night. Next morning Gaultier noted white powder in the vomit, and the patient confessed her attempt at abortion. Clinical examination showed no fever and normal blood-pressure, pulse-rate, blood-count, and urine. She was given no treatment. Complete gastric intolerance lasted twenty-four hours, and then the patient swiftly recovered; two days later, when she was doing her usual work, her menses reappeared. She was kept under medical observation for a year, during which there were no signs of liver, kidney, or thyroid trouble.

CUTTING THE COAT

IN a white-paper issued at the beginning of this week [5] the Government announce their proposals for reducing capital expenditure next year by £180 million; the former gross estimate was £1600 million. So far as the health services are concerned, the Government take the view that some large water projects can no longer be safely postponed, and that the work of increasing rural water-supplies should go forward; and there is to be a limited additional amount of work on hospitals, mental institutions, and other medical installations. The labour force engaged on all this work, which was 18,783 last June, will rise to 24,000 by next June.

1. Perrault, M., Bovet, D. *Lancet*, 1946, i, 721.
2. Himsworth, H. P., Morgans, M. E. *Ibid*, p. 800. Morgans, M. E. *Ibid*, 1947, i, 519.
3. Schwob, R. A., Derobert, L., Malzevin. *Bull. Soc. méd. Hôp. Paris*, 1947, 63, 817.
4. Gaultier, M. *Ibid*, p. 877.
5. Capital Investment in 1948. Cmd. 7268. H.M. Stationery Office. 6d.

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Special Articles

THE PROBLEM OF GASTRIC CANCER

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DESPITE encouraging progress in dealing with cancers in more superficial and accessible sites, cancer of the stomach remains a desperate problem for the clinician and desperately fatal for the victim.

Though the total incidence of cancer is believed to be about the same in the two sexes, in the rich and the poor, and in all nations, gastric cancer has sex, social, and racial distinctions. The racial incidence varies from 20% of all cancers in Great Britain to about 40% in America and over 50% in some Continental countries.[22] It is much commoner in the poor than the rich, and the preponderance of males is 3 : 1 in America and 4 : 3 in Britain. But in all civilised countries where records are kept it is seen to be the chief cause of death from cancer, being responsible for 13,000 deaths annually in Great Britain, and about 40,000 in the U.S.A.[46]—i.e., 33% of all cancer deaths.[29] Worse still, as Ogilvie [32] points out, its highest incidence in men and women is between the ages of 40 and 60, when they have established a place in life, a home, and a reputation; when they are most useful to their profession and their country, and most necessary to their families. It is the commonest type of cancer with the worst results from treatment, for on the average only 1–4% of all patients are alive after five years following curative surgery, and only about four months' prolongation of life can be obtained by palliative treatment.[27]

What can be done to decrease this toll of valuable lives? Apart from the possibility of prevention, about which we can do little until we know more of the causal factors, the problem is one of diagnosis and treatment. Early diagnosis is particularly important, for we know that most patients can be cured by radical surgery when the disease is localised to the stomach.[10] But at present some 80% of cases of gastric cancer are beyond any hope of cure by surgery alone when first brought to the surgeon.[30] In spite of the tremendous advances made in the surgical treatment during recent years, radical surgery can hardly become more radical. What of irradiation? Post-mortem findings show that over 20% of people dying of gastric cancer have the disease still confined to the stomach and immediately adjacent glands,[26] but the results of irradiation so far have been disappointing, though they should improve with the wider use of such methods as direct irradiation at high intensity.[12 13] This improvement may not be dramatic, however, and we are forced to conclude that improved results must mainly depend on getting more early cases to the surgeon, and so on earlier diagnosis.

REASONS FOR TOO LATE DIAGNOSIS

Why is diagnosis so often too late? The blame is shared by the patient, the general practitioner, and the consultant. At the New York Hospital it was found that the average duration of dyspeptic symptoms in a series of gastric cancers before admission for treatment was $12^1/_2$ months.[9] The patient took an average of 8 months to seek advice from his doctor, who then took an average of $4^1/_2$ months to reach a tentative diagnosis. Sometimes indeed there was a delay of 6 months or more in the outpatient department, in spite of all the diagnostic aids, before a diagnosis was made and surgical treatment sought.

Why should the patient hesitate in seeking advice? As Finch [14] says, the main reasons are ignorance, fear, false modesty, and gullibility. Gastric cancer produces no definite and characteristic symptoms in the early stages, and it is often only the onset of complications that may arouse the patient's suspicions.[44] Indeed, many cases are devoid of symptoms until the disease is inoperable [30 36 43]; or symptoms may have been present for a few weeks only, though the disease is much older. On the other hand, the recognition of vague symptoms depends on the sensitivity of the patient, and in some people symptoms only become obvious when frequently repeated and gradually intensified. Gastric cancer begins in the stomach as a limited disease and may remain so for a long time, with mild and hardly recognisable symptoms.[28] Curability depends on its recognition and prompt surgical treatment during this stage. But most people consider a mild degree of gastric discomfort to be a part of the normal process of growing old, and indigestion or dyspepsia signifies to them an uncomfortable but benign process.[29] Patients generally will not seek medical advice in the early stages of such vague symptoms as loss of appetite, mild epigastric distress, or slight loss of weight [36]; only too often they treat themselves for months with one or more of the many alkaline panaceas, encouraged by the relief these often bring even in gastric cancer. There is no part of his own or someone else's body the average layman feels more competent to treat than the stomach, and no part of the body where such interference so often leads to disaster. When finally he does seek advice, his doctor may persist with similar remedies and minor dietary restrictions without proper investigation, until it is too late. Both practices must be deplored. The advertising of dyspepsia cures to the public should be prohibited by law,[1] for in Ogilvie's words [30] "alkalis are the undertaker's best friend." The tremendous sale of patent medicines encourages self-diagnosis or chemist's diagnosis and treatment.[23] In about half the cases gastric cancer has spread beyond the stomach before pain and repeated vomiting occur, the common dyspeptic symptoms bringing the patient to his doctor.[4] Pain and bleeding are the symptoms that bring the patient to his doctor "at the double," and their absence in the early stages of gastric cancer lull him into a false feeling of security.

RE-EDUCATION

We must become more "cancer-minded."[33] This means re-education of the general public and the medical profession as a whole to make them more cancer-conscious. For the layman, a nation-wide propaganda campaign is badly needed, as carried out so successfully in the U.S.A. and New Zealand. We must get rid of the paralysing fear of cancer, by emphasising the fact that early cancer can be cured. At present most people feel it is almost a death sentence to be told they have cancer—as indeed it still is only too often. Unless and until we can hold out more hope of a cure, patients will not present themselves freely for early diagnosis. When they do come along with vague dyspepsia, we must not laugh at them or call them neurasthenic, but must investigate them thoroughly. The usual objection to educating the lay public is that it will produce neurotics and introverts, who will inundate the medical profession with their silly or imaginary complaints. But neurotics are born, not made, and they flourish more readily in an atmosphere of ignorance and superstition. We must remove by education the reasons for not seeking advice early—ignorance, fear, false modesty, and quack remedies. We need propaganda to counteract the inherent tendency of people to treat and palliate their own digestive complaints.

Much could be done in the schools by instruction in the principles of human anatomy and physiology, together with simple rules for health. This should help to remove the fantastic misconceptions about the body and its care that still exist in most adult minds, often fostered by ignorant and prudish parents. Even as medical

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students we are taught little about health and how to safeguard it. For adults, carefully worded and illustrated propaganda could be disseminated by the lay press and by cinemas as well as by radio talks. It must be cunningly insinuated into the usual entertainment. Special lectures or publications usually have too limited an appeal to reach many people. The gist of the propaganda should be to encourage people to avoid seeking advice from their neighbours or the chemist, but to go straight to their doctor when they notice any untoward symptoms, which could be indicated briefly. It must emphasise the fact that even slight symptoms may sometimes be serious, that early diagnosis vastly increases the possibility of cure, and that delay may be dangerous to oneself and cause distress to other people.

As regards the medical profession, it is a depressing thought that most of our teaching and clinical experience is with inoperable gastric cancer. Teaching will be vain if it does not help us to diagnose the disease earlier while still operable.[9] It is relatively unimportant to patients that inoperable cancer can be diagnosed correctly. That can almost be done by the uninitiated, and it is too late to help much then! Most accounts in surgical textbooks of the symptoms and signs of gastric cancer are of the late and inoperable stages, since the early stages have no definite and characteristic symptoms. Most textbooks need to be rewritten in this respect. The average medical student is not much interested in cancer and its early diagnosis and treatment, not being aware of the urgency of the problem. He will say there are many more exciting things to learn about, and the outlook is so hopeless anyhow—why can't we leave such people to die in peace? This defeatist attitude is the result of our medical educational system, which is badly in need of drastic revision. Had the pioneers of our profession thought likewise of the other diseases—e.g., tuberculosis, syphilis, and smallpox—we would still be in the dark ages of medicine. We are still in the dark ages of the diagnosis and treatment of gastric cancer.

INVESTIGATION

Alertness of the patients to the vague early symptoms, and careful assessment of them by the medical profession, are the chief means of early diagnosis. Many doctors do not fully appreciate the need for thorough investigation at this stage. Early diagnosis is difficult and rare mainly because cancer is never suspected then. Anyhow, most doctors feel that the prognosis is so bad that they will not urge reluctant patients to undergo investigation, and thus the time is missed when a cure might well be possible. But if they felt that once a cancer was diagnosed it could be cured, their whole attitude would change. Before any progress is possible we must break this vicious circle.

Early diagnosis needs not casual and superficial attention but eternal vigilance. More mistakes are made through not looking than not knowing. Generally speaking, at present we are not making the best use of the diagnostic aids available. Mullen[29] has divided physicians into two classes—those who always suspect gastric cancer and never find it; and those who never suspect and always miss it. The first complain of the futility of their efforts; the second of the hopelessness of the disease. To the suspicious physician the present diagnostic methods suffice for very many more patients than those to whom they are applied. Gastric cancer is always later than you think, and any delay in diagnosis lessens the patient's chance of having the only known method of cure—surgery. Instead of being thought of last, or often not at all, gastric cancer should be thought of first in the diagnosis of every dyspepsia, irrespective of age.

Physicians, who usually see the patients first, cannot expect surgeons to improve the outlook of gastric cancer merely by further improvement in surgical technique. Allen[1] has shown that, at the Massachusetts General Hospital, though the resectability-rate increased from 27% in 1933 to 37% in 1939, and the operative mortality decreased from 38% to 25%, the five-year cure-rate rose only from 20% to 21%. So, with increased courage and skill on the part of surgeons, more patients were operated on and survived operation but there was no appreciable increase in cure-rate. Only when a greater proportion of operable cases are brought to the surgeon will more cures be effected by surgery alone. Hence earlier diagnosis is the crux of this problem.

This is the psychological age in medicine. Only too often our patient's symptoms are classed as neurotic or functional, if a possible or likely cause is not found easily on examination and investigation, which is often superficial and incomplete. Many patients have been sent to the psychiatrist because of such a failure to diagnose the disease. Assuming that every possibility of physical disease has been eliminated, he can always find some kind of psychic trauma to explain the symptoms. (Who has not suffered some psychic trauma at some time?) So patients have been treated with hypnosis, narco-analysis, or even continuous narcosis instead of radical surgery, which has not been sought until the true diagnosis was only too obvious. The more often a genuine disease is thus misdiagnosed and wrongly treated, the more likely is the patient's behaviour to become hysterical and exaggerated, like that of someone about to be buried alive. Each time he sits up to protest he is alive, he is pushed back with the assurance he is dead and about to be buried! Let us not be too impatient to dismiss our patient's complaints as neurotic, but rather search more patiently and diligently for the cause if it eludes us at first. Even neurotic patients may develop physical diseases, including carcinoma of the stomach, though their dramatic description of their symptoms may contrast with the paucity of their physical signs.

Radiography and Gastroscopy

Too late diagnosis may be due to the diagnostic methods we use or, more likely, to our interpretation of them. It is now well recognised that radiography and gastroscopy together are essential and complementary investigations for gastric cancer,[11] but they are not used together sufficiently often when cancer should be suspected. Though neither is infallible and each has its shortcomings, a combination of both will give a higher number of correct diagnoses than will either method alone.[38 39 41] Moreover the radiologist and gastroscopist must be expert, thorough, and persistent, for though the diagnosis of late cases only confirms the clinician's opinion and is easy, the diagnosis of early ones may confirm a mere clinical suspicion and is highly skilled and difficult.[29] In expert hands these methods are nearly always accurate, but in other hands they can be dangerously misleading.[16]

By gastroscopy, with adequate preparation and premedication together with careful and gentle instrumentation, it is nearly always possible to examine the whole stomach. Correct interpretation of the findings is far harder and requires careful observation and long experience, as well as correlation of the findings with those of the radiologist, the surgeon, the microscopist, and even the pathologist at autopsy. Gastroscopy is most useful in helping to decide between simple and malignant ulcers.[3 38] Some cancers are not seen by gastroscopy (1) because gastroscopy is impossible, as in cardiac obstruction by the tumour, or leather-bottle stomach which cannot be distended with air to give a good view, and (2) because the tumour is hidden in one of the blind areas found in some stomachs. As regards gastroscopic biopsy, we have as yet no instrument with which this can be performed safely and easily. But even biopsy is not always reliable, especially when negative; and,

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since the degree of cellular differentiation may vary from place to place in a tumour, the value of a single biopsy is problematical.[40] If less reliance were placed on radiological findings, especially when doubtful or negative, and if gastroscopy by an experienced observer were included in the routine investigation of all dyspepsias, we should diagnose more early cancers.

Some cancers, especially early ones, will not be found by radiography at the first or even subsequent examinations. The method fails most often in ulcer-cancer, where sometimes only a pathologist can tell the simple from the malignant ulcer.[15 45] The radiologist must be persistent: a single negative result must not lull him, the patient, or his doctor into a false sense of security; and if the symptoms continue the examination must be repeated frequently, preferably by the same expert. Minor but constant defects in peristalsis, due to infiltration of the submucosa, may be seen by radiography. Ledoux-Lebard [24] uses many rapidly taken or superimposed films to show obliteration of rugæ, changes in the mucosal pattern, and persistent defects in peristalsis. Gross filling defects due to ulcer or tumour are easily detected, but they are not due to early cancer.[29]

Radiography will give good results only if the mucosal-relief technique with compression and spot films, combined later with complete filling of the stomach, are used.[38 41] The mucosal-relief technique [2] shows fine details of the mucosal pattern, and spot films [21] permit recording of any phase of the radiographic examination without interrupting the screening. (This last is used to study gross details and for aiming the machine in taking spot films, which give a permanent record with finer detail.[6]) It must be constantly remembered that, taken generally, positive findings on radiography are reasonably reliable, but negative results may be dangerously misleading. Cooper [9] reports a correct radiological diagnosis in 70% of cases at the first examination, increased to 90% after repeated examinations. But this diagnostic accuracy is offset by the fact that 85% of these cases were hopelessly inoperable, and it would probably be much less accurate in earlier cases. As Wangensteen [44] has put it, too many doctors are credulous enough to accept the opinions of the radiologist as though he wielded an infallible divining-rod; whereas overwork and poor equipment may make him little more reliable than a crystal-gazer. There is a need of many more radiologists trained in the latest methods of gastric examination, and for great improvement in radiological equipment. This should include spot machines and tilting tables, and might well provide for a ciné-film record of all screen examinations of œsophagus, stomach, and duodenum.

Gastric Acidity

Gastric-acidity estimation is helpful provided the total response to histamine is estimated.[19] Results are fairly constant, for Polland [34] found the acid below normal or absent in 85% of gastric cancers, and no case of hypoacidity in gastric ulcer. Allen [1] noted achlorhydria in 60% of malignant ulcers and said that malignancy was to be expected in the achlorhydric stomach though the presence of acid did not rule out cancer. Reid [37] and Brunschwig et al.[5] concluded that 60% of patients with gastric cancer have achlorhydria, and Mullen [29] found it in 70–80%, though he felt the presence of high acidity did not disprove cancer, especially with a prepyloric ulcer. Lewis [25] considered achlorhydria one of the most valuable early signs of malignancy, and Holman and Sandusky [20] held that low or absent hydrochloric acid remains the most reliable single piece of evidence of gastric cancer. Comfort et al.[8] have shown that the acidity is nearly always below normal in patients destined to develop gastric cancer, and that this low acidity develops early and persists.

Other Investigations

The many other investigations that may help us to diagnose gastric cancer include estimation of hæmoglobin and blood-cell levels, erythrocyte-sedimentation rate, plasma-protein content, plasma and urine vitamin levels, and liver-function tests.[35]

But too much reliance must not be placed on these aids to diagnosis, especially when they conflict with our clinical suspicions, which should always be given the utmost consideration. Too many patients have lost their chance of life because a single investigation did not confirm the physician's suspicions of gastric cancer. With persistence of symptoms, however vague, this is not sufficient reason (as Reid [37] says) for assuring the patient all is well and forgetting him. We may be wrong in our suspicions; but, in the words of Ogilvie,[32] if we always wait until we are sure we are right, we shall always be just too late to cure the patient. It must be borne in mind that, though the highest incidence of gastric cancer in women is between 40 and 50 years and in men between 50 and 60 years, this is not by any means a disease of middle or old age, and anyone over 30 years may be affected. Walton [43] and Ogilvie [30] say that dyspepsia developing in a person over 40 years, without any previous dyspeptic symptoms, is due to cancer until we have proved it otherwise.

Laparotomy

All competent authorities agree that, should any dyspepsia not respond to proper medical treatment within a few weeks, it should be fully investigated. If the results are inconclusive or negative but the symptoms persist, the investigations should be repeated, and even a laparotomy performed. To wait and see courts disaster; far better to look and see. Though unnecessary operations are to be deprecated and should be avoided,[11] laparotomy is the best of all means of discovering the presence or absence of gastric cancer. Then we are faced with reality, not merely shadows in a film. Exploration by a gastric surgeon should be safer than allowing the passage of time to decide the correct diagnosis (Wangensteen [44]). A live mistake, says Ogilvie,[32] is better than a dead certainty, and there is more rejoicing in heaven over one negative laparotomy than over ninety-nine that are positive but too late.

SURGICAL TREATMENT

If the diagnosis is still in doubt even at laparotomy, we must take what is the safest course for the patient; for our only chance of curing him is at the first gastric operation. So we must ensure that radical surgery is used whenever possible, not only in every proved case of gastric cancer but also in every case where it is even suspected on exploration. If we do any less than this we are not taking advantage of the best opportunity to cure the patient. The happiest way to diagnose gastric cancer is to be told by the pathologist after such a gastrectomy: "That's a cancer, that was!".

So it is imperative that the surgical diagnosis and treatment of gastric cancer should be left to properly trained and competent surgeons. Nobody who is not able and willing to perform the most radical operation possible should attempt to operate on a patient suspected of having gastric cancer.[29] He must not rush in with unseemly haste but must organise the whole procedure like a general planning a campaign, paying due attention to adequate preoperative preparation and postoperative care.[12 35 37 44] The operation must be planned to deal with the peculiar features and possible or actual spread of the disease in each case. The experienced surgeon will set out to remove the whole of the disease and will decide on the best method of restoring the continuity of the alimentary tract after this has been done[29]: he will not cramp the scope of his operation by some

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preconceived form of anastomosis, which might lead to failure to extirpate the growth completely. In outline the operation should involve radical removal of the tumour and all the accessible potential field of spread, glandular and local, even in the absence of palpable glands. This is generally recognised as the best means of treating operable cancer of the breast or colon.

Gastric cancer is likely to spread round the duodenum and head of the pancreas, as well as along the left gastric vessels; hence these areas should always be dissected adequately.[7 30 43] Failure to do this is often excused by the absence of palpable glands, but it is really an incomplete attempt to eradicate all of the disease. For many large glands are inflammatory, whereas many small ones, even when impalpable, are neoplastic. Without microscopical section, and often even with it, we cannot be certain whether a gland is involved by growth. So the extent of the standard operation of gastrectomy for cancer should be increased rather than decreased.[1 30] It may be impossible to define clearly the actual extent of spread in the stomach wall, and subtotal gastrectomy may divide an extension of the growth. In such a case total gastrectomy might increase the chances of cure, though the patient has to survive a far more risky operation. When it seems possible to get clear of any extension of the growth in the stomach or duodenal wall, radical gastrectomy [30 31] should give the best chance of cure.

Most authorities agree that surgery is always worth while, except where there are clinically obvious widespread metastases. The desperate case (though not the hopeless one) is worth exploring, for laparotomy is the only reliable way of deciding the correct form of treatment.[42] Gastrectomy may be undertaken as a curative or merely a palliative measure, and the criteria of operability vary with different surgeons.[11] Should curative radical gastrectomy be impossible, owing to irremovable local spread of the cancer or to the patient's poor general condition, direct irradiation at high intensity [12] may be possible. If this is impracticable, palliative gastrectomy, by removing the primary lesion while leaving the more distant spread of the cancer, may increase the patient's comfort without improving his prognosis. Apart from this there are other less severe palliative operations, such as gastric exclusion, gastrojejunostomy, gastrostomy, or jejunostomy, which may relieve suffering without appreciably prolonging life. They may allow the patient to put his house in order and make some provision for his family, and sometimes they lead to surprising improvements in condition.[18] It is unjustifiable merely to close the abdomen when an inoperable lesion is found. By so doing, we fail in our primary duty to our patients—to alleviate suffering.[17]

ORGANISATION

Wise implementation of the Cancer Act, in conjunction with the impending National Health Service, offers an unparalleled opportunity for improving the diagnosis and treatment of gastric cancer. Division of the whole country into regions, each with its cancer centres for diagnosis, treatment, and follow-up, should enable all patients suspected of cancer to be examined, treated, and followed up by experts. This should be a great improvement on the present disorder, provided we make sure that the "experts" are sufficiently trained and experienced in their specialty; but, as Finch [14] says, we must avoid the development of the "cancer specialist" or "cancerologist." Further, the cancer centres must not be set up naked and unashamed, as long as people generally have such a fear of cancer, which still carries some social stigma. They must be disguised by the enveloping cloak of a general hospital, where all the allied diseases of the same viscera can be dealt with in each department. Having all kinds of dyspepsias, and perhaps other surgical conditions, mixed in a ward with gastric cancers is of inestimable value to all concerned. It helps the morale of the cancer patient to see others having operations and getting well; it helps preserve the mental balance, sanity, and cheerfulness of the doctors and nurses; and it reduces the difficulty of obtaining medical and nursing staff.

The danger of all this planning and organisation is the damping down of individual enthusiasm and initiative, with the development of mass-thinking, leading to a millennium of mediocrity. We must strive to preserve our freedom of thought and action, which must be coupled with a desire for genuine progress and an increase in knowledge. This will be achieved only by continually striving with humility and an inquiring mind. We must ensure that change means real progress, and that the welfare of the patient always remains the first consideration.

In the meantime while the "back-room boys" are working out new methods of treatment, and the planners are at work, we should try to make much better use of the methods of diagnosis and treatment available now. As has been said above, the present diagnostic methods are adequate for very many more patients than those to whom they are applied, and radical surgery can cure the large majority of patients with gastric cancer if carried out when the disease is localised to the stomach.[10]

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UNIFICATION OF PHARMACOPŒIAS

AN expert committee has been set up by the Interim Commission of the World Health Organisation to consider unification of pharmacopœias. The first meeting, held at Geneva from Oct. 13 to 17, was attended by Prof. H. Baggesgaard Rasmussen (Denmark), Prof. E. Fullerton Cook (United States), Prof. I. R. Fahmy (Egypt), and Dr. C. H. Hampshire (Great Britain). Prof. R. Hazard (France) was prevented by illness from attending. The members were welcomed, in the name of the executive secretary, by Dr. R. Gautier, counsellor, who said that the duties of the committee would be to continue the work which had been begun by the technical commission of pharmacopœial experts of the League of Nations. Dr. Hampshire was elected chairman.

The committee accepted the general principles expressed in the interim report of the previous commission published in 1945, and approved the monographs contained therein, subject to consideration of any comments which might be received later. The intention that the recommendations of the committee should take the form of an international pharmacopœia was approved, the scope to be limited in the first place to drugs considered essential in medical practice. It was understood that such an international pharmacopœia could have no authority in any country until it had been adopted by that country.

A list of 534 drugs was considered, and 244 were selected for immediate attention. It was decided that monographs on the drugs for which the committee on biological standardisation had provided standards should be included. Thirty draft monographs were completed, making with those in the interim report a total of seventy-two. The possibility of establishing an international procedure for naming new drugs at an early stage of their introduction, and the standardisation of surgical ligatures, sutures, and dressings were also discussed and reserved for future consideration.

In view of the volume of work to be undertaken and the necessity for widening the international basis of the work, the committee recommended that at least three additional members should be appointed and that a unified secretariat with specialised staff should be formed.

CULTURE COLLECTIONS OF MICRO-ORGANISMS

FOLLOWING a decision of the British Commonwealth Scientific Conference of 1946, a conference on culture collections of micro-organisms was held at the London School of Hygiene and Tropical Medicine between Aug. 5 and 8; it was attended by 28 delegates and 18 observers from different parts of the Empire. Mr. H. G. Thornton, D.SC., F.R.S. (Rothamsted Experimental Station), was elected chairman of the conference, and sessions were held under the chairmanship of Mr. N. E. Gibbons (National Research Council of Canada) and of Mr. W. I. B. Beveridge, D.V.SC. (Walter and Eliza Hall Institute of Medical Research).

In the United Kingdom few collections undertake to distribute cultures to general workers, but there are numerous small private collections that will supply cultures to an individual as a personal favour. In other parts of the Commonwealth only the non-distributing type of collection exists, and one of the problems discussed was the need to establish distributing collections overseas. The debate on this subject was lively and showed two clearly divergent views: the majority favoured small specialised collections with a national collection and coördinating centre in each country, but a vocal minority preferred greater centralisation in large collections in the United Kingdom.

Recommendations were made that an organisation to be known as the British Commonwealth Collections of Micro-organisms should be established with a permanent committee and secretariat in London. To this organisation was allotted the task of making known to microbiologists the availability of cultures in existing collections, and, where necessary, of helping to establish new collections. To increase the usefulness of existing collections it is proposed to compile a directory of culture collections within the Commonwealth (with mention of the more important foreign and international collections) giving details of the kind of micro-organism maintained in each. Uniformity of page-size of catalogues of the individual collections is advocated, so that these can be combined to make a comprehensive Commonwealth catalogue. The largest of these collections, the Medical Research Council's National Collection of Type Cultures, has not issued a catalogue since 1936, and as it will take some time to prepare a new detailed catalogue of its 3000 cultures the conference recommended that a short list of species maintained, without catalogue numbers or strain names, should be issued as soon as possible.

Within the United Kingdom the National Collection of Type Cultures already maintains a large collection of bacteria and arranges for the distribution of pathogenic viruses and bacteriophages to suitable workers; the Imperial Mycological Institute is building up a collection of fungi (other than animal pathogens), and will soon be ready to distribute cultures. The conference thought that the London School of Hygiene and Tropical Medicine should be invited to accept responsibility for a collection of medical fungi (based on Dr. J. T. Duncan's private collection), and that similar invitations should be issued to the Botany School, Cambridge (fresh-water algæ), the Marine Biological Station, Plymouth (marine algæ), and the Institute of Brewing (yeasts). It was not possible to make recommendations, except in the most general terms, about collections of protozoa and plant viruses.

GENERAL MEDICAL COUNCIL

AT the 172nd session of the council on Nov. 26, Sir Herbert Eason was re-elected president.

The following names were restored to the register after penal erasure: Arthur Carr, Isaac David Clein, Gerald Green, Horatio Matthews, Louis Aimee Newton, Thomas Sylvester O'Neill, William Vincent St. John Sutton, and John McKay Young.

The cases of *Reuben Denny*, L.R.C.P.E. (1929), adjourned from November, 1946, and of *Bernard Maguire*, M.B. N.U.I. (1927), adjourned from November, 1945, were reconsidered and dismissed.

The case of *Joseph Anatole France Tobin*, M.R.C.S. (1937), for convictions under the Dangerous Drugs Act 1920 had been adjourned from June, 1947, owing to his ill health. The president announced that the council considered the convictions against him to be proved but did not see fit to direct the erasure of his name.

William Gray Hughes, M.B. Edin. (1918), was summoned to reply to charges under seven heads of giving misleading certificates. The council decided that though the substance of the charge had been proved, the summons to appear had been a sufficient warning to Dr. Hughes and his name would not be erased from the register.

Kenneth Graham Wrigley, L.M.S.S.A. (1935), summoned to answer charges to do with obtaining drugs on false pretences, was found to be guilty of misdemeanour. Judgment was postponed for 12 months.

The name of *James Albert Seavers*, M.B. N.U.I. (1939), who had been convicted of indecent assault in August, was erased from the register.

The cases of *John Hollis Drummond Lawrie*, M.D. Edin. (1926), and *Allan Gillies Foreman*, L.R.C.P.E. (1946), were conducted in camera; but the president announced that the council did not see fit to erase their names.

In the case of *Hugh Boyd Gillespie*, M.B. Glasg. (1935), who had been convicted of driving while under the influence of drink, the council postponed judgment until November, 1949.

Ralph Martin Case, M.B. Birm. (1934), was summoned in respect of two convictions under the Dangerous Drugs Act 1920. Judgment was postponed for two years.

Consideration of the cases of *John Matthew Campbell*, *Raymond Criswick Evans*, *Malcolm Andrew Graham-Yooll*, *William Hamilton*, and *Frederic Syson* was postponed.

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BRITISH EMPIRE CANCER CAMPAIGN

AT the annual meeting held in London on Nov. 26 H.R.H. the Duke of GLOUCESTER, president, said that in celebration of the campaign's 25th anniversary next year a special appeal for funds will be launched. In the past financial year the public subscribed £135,000, not including sums raised in the autonomous areas. This is the highest figure yet reached, but does not permit the necessary extension and intensification of the work.

Lord HORDER, reporting as chairman of the Scientific Advisory Committee, said he felt more hopeful than ever before about the results of cancer research and treatment, and more certain of the service rendered by the campaign. The problem is still the causation of cancer—not the cause, "for of causes of cancer we have already an abundance." Any one of the many somewhat isolated facts may prove a pointer. Planning is essential—first the strategy and then the tactics. The 25th anniversary appeal will give the public an opportunity of making the programme which the campaign has in view a real and not a visionary one. It is an ambitious programme, and very expensive, but vital in the public interest:

1. A special committee has been set up to develop research into the whole virus position in relation to cancer. This involves the activation of several ad-hoc teams up and down the country. A grant of £25,000 has already been set aside for this research.

2. Travelling fellowships are imperative, with long-term agreements of from five to ten years' duration, if the acute shortage of workers is to be provided against.

3. The campaign requires another special committee set up to organise research on chemotherapy.

4. The new tools of atomic-energy physics must be made available to B.E.C.C. workers.

5. Lastly there is great need of education with regard to cancer, both of the doctor and of the public. Thousands of lives are lost every year through want of diagnosis during the curable stage of the disease. Not only so, there is also the question of prevention; here there is more need for education.

THE MENTAL HOSPITALS

THE annual report of the Board of Control [1] tells of continued overcrowding in our mental hospitals. At the end of 1946 there were 146,444 people under care under the Lunacy and Mental Treatment Acts, 128,579 of these being in public mental hospitals. The total beds in these hospitals fall short of this number by some 1500, and their numbers are further reduced—from such causes as staff-shortage, need for restoration and re-equipment, and diversion of beds to war-time casualties—by over 15,000. Thus overcrowding amounts to 13·1% on the basis of recognised bed-space. More than half the admissions in 1946 were of voluntary patients. Total admissions showed an increase of 6009 over those of 1945—an increase due, the board feel sure, not to a rise in the incidence of mental illness but to a growing awareness of the need for early treatment. They estimate that during the next ten years an additional 1500 beds a year may be needed; and presumably they assume that these will be in addition to existing idle and diverted beds when these have been reclaimed for the mental hospital service.

The "most serious single handicap" under which the service has laboured has been, and is, shortage of nursing staff. By the turn of the year, it seems, some hospitals found the situation easing slightly, and many made use of auxiliary staff—orderlies and the like—and of part-time voluntary workers from the British Red Cross Society and the Order of St. John, and from the Women's Voluntary Services. The practice of requiring nurses to sleep on the wards seems to be dying out.

The board note that the possibilities of occupational therapy for patients with long-standing mental disorder are not yet fully understood by many who work in hospitals.

1. Part I. H.M. Stationery Office. 1947. Pp. 40. 9d.

In England Now

A Running Commentary by Peripatetic Correspondents

THIS is no time for lightly proposing new textbooks and manuals, but I am worried about recently qualified men who don't understand what the patient says. Oughtn't there to be a glossary of lay terms for medical people; for remember the man who, when a patient told him she "hadn't seen anything for three months," sent her to the Eye Department? Does every new doctor realise that "tummy trouble," spoken of in an open and cheerful manner, means upper abdominal pain, whereas if there is a dropping of the voice and eyes it means diarrhœa? "Inside trouble," is always gynæcological, and to "have all one's inside out" is to have a total hysterectomy not a pan-evisceration. "Something coming down" is again usually gynæcological, but may occasionally be a thrombosed pile. Another point to remember is that the urinary bladder is rude and will be referred to in a shamefaced way as the waterworks, while the gall-bladder is a polite and interesting organ and can be discussed freely at tea-parties; and if a woman ruefully confesses that she has "fallen again," the doctor should not ask if any skin was knocked off. "Dizzy turns" and "blackouts," of course, may be anything, but usually after exhaustive investigations prove not to be epileptic attacks. In fact, anyone who has had to deal with soldiers will recognise blackouts as simple blackouts, and leave it at that.

The glossary should also deal with terms in use in various parts of the country. At my first outpatients in a Nottingham children's hospital the first mother complained that her child was "tissucky" and the second that hers was "mardy." The first child had a mild bronchitis; the second was fractious, bad-tempered, and generally difficult. Both lovely words but very confusing at first acquaintance.

* * *

Invited by the ever-attractive possibility of getting something for nothing, we found ourselves a week or so ago wandering through the doors of the London Medical Exhibition. As we stepped into the Odeon-like foyer we were eyed narrowly by a gentleman suspiciously demanding if we were "of the Profession." We reassured him with some disdain, adding in explanation of our immaturity and general untidiness that we were residents of St. Ethelred's. "Ah yes," he beamed at us, "most welcome, I'm sure. You will find the bar on the lower floor."

I am an experienced exhibition-goer, being educated all the way from the original Wembley extravaganza by way of the Ideal Homes, Radiolympia, the Motor Show, and the 1937 *Exposition de Paris*, to last year's Chelsea Flower Show. At all of these gatherings, with the understandable exception of the Flower Show, an exuberance of free samples was available to be carried away by the delighted visitors. I have left such affairs to find my pockets bulging with all sorts of junk from model rubber tyres and improved lavatory brushes to a free annual subscription to a society journal. The subsequent problem of finding what the hell to do with the collection appears negligible against the thrill of their costless acquirement.

The Paris exhibition was highly satisfying from the sampler's point of view, for the champagne and cognac stands cascaded their wares, and free bottles of Grand Marnier went along with buckshee crêpes suzettes. At the Horticultural Hall we had to content ourselves with jostling towards a salver of diabetic chocolate, a couple of diabetic rolls (no butter), a cup of baby food, some strained carrots, and what later turned out to be a handful of raspberry-flavoured laxative. In addition, we are now confidently expecting the daily arrival of small though gratuitous packages of malt drinks, phenobarbitone, nose-drops, hair-oil, and contraceptives.

As we wandered through this hippocratic bazaar we greatly enjoyed listening to an all-electric stethoscope and diathermying large slices from an appetising hunk of raw horse-meat. We were enchanted with an illuminated tableau of the internal workings of the halibut, and with a sort of radar screen ultimately attached to a frog's gastrocnemius. The corset-stand attracted our

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passing attention, the charming young lady who explained the mechanics of the apparatus appearing only slightly disappointed when we failed to place an order (there were no free samples). Several nearby stands advocated the waters and general social amenities of our British spas. In response to our mild inquiries an enthusiastic young fellow enlarged on the beneficial effects of these towns, in gratitude for which we allowed him to post on a wide selection of spa literature—giving the name of a member of the Ethelred's staff renowned as an incorrigible bon viveur.

The anæsthetic apparatus was worthy of its almost invariable appearance at some point in any recent British film. We have left the days of the rag-and-bottle so completely behind us that one feels self-conscious inducing anæsthesia with anything not resembling the front of a Buick, and of about the same price. The modern anæsthetic machine contains so many otherwise anonymous knobs labelled PRESS as to constitute an invitation to manslaughter for enthusiastic though inquiring anæsthetists like ourselves. We pressed a few knobs here and there, and were piqued when nothing seemed to happen. By that time we had goggled at the glittering machinery so long that we fully expected either Schenectady or a boiled egg to come out of the cabinet somewhere.

* * *

Ordinary associations of ideas are with the conscious rather than the unconscious content of the mind. A provincial psychiatrist, musing in Victoria Station, thought hardly at all of childhood fantasies of being an engine-driver, and still less of their possible origin in the desires to play clockwork trains on a vast scale, or to be grown-up, or in latent aggressive drives or what-not. He thought that the local departure boards read like a mental hospital directory, so many of the names being those of well-known mental hospitals. However, the provincial psychiatrist restrained himself from passing a devastating judgment on the mental health of the Metropolis by recalling that the number of mental hospitals in an area is an index, not of the amount of mental disease but of the adequacy of the hospital services.

* * *

An interesting study might be made of mass-psychology in relation to sport and the almost hysterical excitement which may be provoked by the sporting party-spirit. The enthusiasm which used to be limited to the village green is now extended (by cable and wireless) to the ends of the world, and for days before and after it several million people may talk, think, and possibly dream of a combat between two cricket, football, or baseball teams.

This was forcefully brought home to me one Sunday when my stay in Chicago happened to coincide with the world series of baseball matches in New York. Chicago is rather jealous of New York, and the listeners in the former city were mostly in sympathy with the Dodgers of Brooklyn who were challenging the Yankees of New York. The excitement was intense, and for several hours each day for seven days wireless sets both at home and in public were surrounded by people alternately thrilled or depressed by the turn of the play. On the Sunday I listened in the house of a surgical friend whose excitement was clear when he held out his hands, saying "Look, they are wet with perspiration." But the baseball was not the whole of the thrill. At the same time and in the same room a television set was showing, with commentary, a football match between two famous Chicago teams. It was a trifle difficult to follow the two highly technical commentaries simultaneously but there is little which is impossible to the votaries of sport.

* * *

In this Service hospital the orthopædic staff is composed of widely different types. On the one hand we have the men who have done it all, and on the other the struggling youngster, who, through the exigencies of war, has forgone clinical experience, and now that the tumult has died down has forsaken the bayonet for the scalpel. This morning on entering the theatre I was greeted with the question: "Who's doing the list today, orthoplods or orthogods?"

Letters to the Editor

TEACHING APPOINTMENTS

SIR,—It is not easy to decide from his pseudonymous letter of Nov. 22 whether "M.R.C.P." considers medical research to be a positive evil, or merely a useless waste of time which might be better spent on conning textbooks of general medicine or whipping up enthusiasm and flair for teaching. From my own small experience of medical research, I doubt whether it can be identified with the "increasingly narrow specialism" which everyone engaged in the teaching of medicine must deplore. I am still more doubtful whether, as your correspondent seems to imply, there is any necessary antagonism between research experience and the ability to teach students. Naturally, these two qualities are not always found in combination; just as there are research-workers who cannot give a clear account of even their own work, so there are good teachers "of the list type" who would be patently useless at doing research. But the mere fact of having done research does not in itself make a man a bad teacher; on the contrary, good students appreciate some knowledge of physiology and of recent work in medicine. Although unlikely, it will still be unfortunate if in response to the solicitations of "M.R.C.P." universities should decide to dismiss research ability from their consideration in appointing senior staff, and so turn themselves voluntarily into training schools for medical technicians.

Department of Medicine, University of Manchester. D. A. K. BLACK.

OUR PRESENT DIET

SIR,—I read with interest your report (Nov. 22) of the Hunterian Society's debate, but it was disappointing not to see more emphasis placed on the fact that all the figures quoted were average values and therefore required interpretation in human terms.

The report on nutrition drawn up by the technical commission of the Health Committee of the League of Nations in 1935 and 1936 points out that the values the commission agreed are average figures and that "it is essential that they should be interpreted in the light of this fact."

Dr. Breen made a brief reference to the variation in energy derived from a given meal; this, surely, is the crux of the whole matter, and probably accounts for the inconclusive nature of discussions on our present-day nutrition. Some individuals, it seems, are able efficiently to assimilate the food they eat and our present diet may be greater than their bodily requirements (cases of exogenous obesity are still observed), whilst others, whose metabolism is not so efficient, may obtain too few calories for health. This point is recognised in the terminology of the report quoted above. The term "net calories" used in this report is defined as "the amount of energy available from the food *actually assimilated*" (my italics).

Radlett, Herts. T. C. BLACK.

FRACTURED CLAVICLE

SIR,—In your issue of Nov. 8 Mr. J. S. Batchelor describes a somewhat elaborate invention for splinting a fractured clavicle or an acromioclavicular dislocation. May I remind your readers of the simple and effective method which Frank Romer[1] devised for controlling the fractured clavicle by strapping?

The surgeon, standing behind the patient, raises the arm on the injured side to form a right angle with the body, and draws back both shoulders firmly. This manœuvre reduces the deformity, bringing the scapula into correct position for strapping. A thin layer of cotton-wool is then placed in the axilla. A strip of adhesive strapping (about $1^1/_2$ in. wide) is fixed by one of its ends over the acromion and brought down behind the shoulder-joint, under the axilla, up anteriorly to the top of the shoulder at the acromial end of the clavicle, and backwards over the scapula to below its inferior angle, where it ends. A similar strip is fixed starting from above the nipple and passing over the clavicle to just below the inferior angle of the scapula. Two more overlapping strips are applied

1. Romer, F. *Lancet*, 1923, i, 889.

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so as to cover the whole of the clavicle. The arm is then gently lowered, and the patient is allowed to dress himself. No support is needed beyond that of an ordinary sling to take the weight of the arm occasionally. The injured parts should be massaged daily for at least ten days. This can be done over the strapping, and should be renewed at the end of four days and again from time to time if slack or uncomfortable. It should be worn for at least three weeks.

Though Mr. Romer did not mention it in his paper, I remember, from the time when I was his assistant, that the first strip had a piece cut out of each side so as to narrow it as it passed under the axilla and prevent chafing.

London, S.W.1. C. V. HARRIS.

DYEING OF SURFACE ANÆSTHETICS

SIR,—In your issue of Sept. 27 (p. 493), two recent cases are mentioned of fatal substitution of a cocaine solution for one of procaine. Fortunately this does not occur often; however, now and again cases are met in the literature of every country. Especially the ear, nose, and throat surgeon, using every day both or similar solutions, often at a single operation, is always threatened by this misapprehension.

The Swiss firm Ciba as long as ten years ago delivered its 'Percaine' (now 'Nupercaine') solutions for surface anæsthesia in a deep pink colour. In the Military Hospital at Tjimahi the same is done to all surface anæsthetics, at my request. Our dispenser, Mr. J. de Jong, uses 1 minim of a 1% fuchsin solution per 50 ml. anæsthetic, by which procedure a deep pink colour is obtained. Fuchsin is a mixture of hydrochlorides of rosaniline and its derivatives. It is absolutely non-poisonous, does not react with the anæsthetic, and is readily soluble in water. The only disadvantage I can imagine is the possibility of its staining garments when spilled. However, the stains are easily removed—for instance by 5% hydrochloric acid in ethyl alcohol, or by 6% hydrogen peroxide in 10% ammonia (verbal communication of J. de Jong). The advantage is that even an illiterate can be taught that tinted solutions are unsuited for injection. Also when the drugs are out of the labelled bottles and in containers on a tray the colour will always indicate a surface anæsthetic, which is very reassuring indeed to the surgeon. The colour is readily visible even in a semi-dark room.

In my opinion it would be advisable to prohibit use of undyed surface anæsthetics.

Military Hospital, Tjimahi, Java. O. L. E. DE RAADT.

TUBERCULOSIS IN EUROPE

SIR,—The leading article in your issue of Nov. 22 is concerned with a recent report of the International Committee of the Red Cross on health conditions in a number of European countries, including Germany.

You point out that tuberculosis mortality figures in Germany today require very careful scrutiny, and you are rightly sceptical of the committee's statement that in the American zone (including the Berlin sector) the tuberculosis death-rate "rose from 20 per 10,000 inhabitants in April, 1946, to 37·5 in April, 1947" (as against 7·3 in 1933). In a report of the military governor, U.S. zone, on public health and medical affairs, the death-rate from tuberculosis in the U.S. zone is given as 6·7 per 10,000 in April, 1946, and 6·6 in March, 1947. Hence the mortality-rates given by the Red Cross committee are some 3–5 times the official figures; and whereas the committee's figures indicate an alarming doubling of the rates in a year, according to official data no change has taken place.

This is not an isolated instance of carelessness. Thus the committee states that in Schleswig-Holstein (British zone) the tuberculosis death-rate, "which was 6·3 per 10,000 inhabitants in 1934/1936, rose to 22·1 for the first half of 1946." Actually (official British sources) the tuberculosis death-rate for this Land in the first half of 1946 was 6·6 per 10,000 (the *notification*-rate of *new cases* was about 22); again the committee presents a figure three times the correct one, and a startling rise when there was none. Some of the committee's comparisons are no less careless, to say the least. In almost every country discussed, an increase in the number of tuberculosis cases on the registers is taken as signifying an increased incidence of the disease; but in Spain this increase "does not arise from the spread of the disease by contagion, but from the fact that the methods for the detection of tuberculosis are more rapid." In similar tendentious vein, the report states that there are "over 12,000 beds for consumptives in Spain in sanatoriums supplied with all technical means for modern surgical treatment"; whereas the 23,000 beds for tuberculosis in August, 1946, in the British zone, with a similar population and a lower tuberculosis mortality, are described as "only 23,000 beds . . . which were not sufficient to admit all infectious cases to hospital."

It is a pity that the names of the members of the medical division of the International Committee of the Red Cross, who are responsible for this uncritical and superficial review, are not given.

London, N.W.3. P. D'ARCY HART.

*** Our leading article quoted the committee as saying that the tuberculosis situation is "particularly disastrous" in Germany, Austria, and Rumania. Actually the committee applied these words to the general situation in these countries.—ED. L.

ROWLEY BRISTOW MEMORIAL

SIR,—Many friends of the late Walter Rowley Bristow have expressed a wish to share in a memorial to him. It has been suggested that his life and work would be best commemorated by the foundation of an annual or biennial memorial lecture, to be delivered, if circumstances permit, alternately in Great Britain and in the United States, the two countries in which he was acclaimed as an outstanding leader in orthopædic surgery, and where he was held in such warm regard. When a sufficient endowment fund has been accumulated it will be entrusted to the British Orthopædic Association. Contributions to this fund are now invited, and can be sent to George Perkins, 149, Harley Street, London, W.1.

G. R. GIRDLESTONE GEORGE PERKINS
CHARLES MAX PAGE HARRY PLATT.

"CHORIONIC GONADOTROPHIN"

SIR,—To question the propriety of any accepted phrase in science may at first appear priggish and pedantic. Accuracy and ease of thought, however, depend largely on exact language; and I offer no other excuse for the following note.

The term "chorionic gonadotrophin," whose suitability is now questioned, was adopted in the past because of a hypothesis which later work has not confirmed.

The word "chorion" is derived from the Greek χόριον, which like the Latin *corium* means "leather," and strictly indicates therefore the subepithelial tissues; but in our language it denotes the outermost membrane of the fœtus. The adjective "chorionic" is commonly applied to the gonadotrophin which is produced by the placenta of a pregnant woman and is present in high concentration in her blood and urine; so used the term "chorionic gonadotrophin" implies to many that the hormone is produced by the chorion of the fœtus. Known facts do not support such a belief. The fœtus has no need for abundant supplies of this hormone, and little if any can be detected in its blood or other parts of its body. These considerations alone make it probable that the gonadotrophin required by the mother is manufactured by her tissues and not by those of the fœtus. Furthermore, in some animals, including the mare, the fœtal and maternal components of the placenta can be separated by manipulation and so analysed apart; and in the mare it has been found in this way that gonadotrophin is present in large amount in the maternal but not in the fœtal component.[1] It is therefore concluded that in the mare placental gonadotrophin is elaborated without a doubt by maternal tissues and not by the chorion of the fœtus. Although the precise origin of placental gonadotrophin has not been determined in every mammal, the process is a fundamental one and is likely to be the same in all.

As a mere argument it may perhaps be suggested that the hormone arises in the subepithelial structures—i.e., the corium (or chorion) of the uterus—and that on this

1. Catchpole, H. R., Lyons, W. R. *Amer. J. Anat.* 1934, **55**, 167.

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account the term " chorionic gonadotrophin " may after all be correct. But this is a mere debating point, for the word " chorion " in general medical parlance indicates the external fœtal membrane and not the corium of the uterus.

I suggest that, to prevent confusion of thought, " placental gonadotrophin " might well replace the more questionable term " chorionic gonadotrophin " at present in use.

Marlborough, Wilts. HAROLD BURROWS.

SUBSTITUTE FOR CANADA BALSAM

SIR,—' Siloxane ' or ' Silicone,' a synthetic resin with a chain of silicon and oxygen alternately, promises to be a useful substitute for Canada balsam, in thick mounts, as it is practically water-white. Its refractive index is much the same as that of Canada balsam, and the technique for mounting is similar.

Mental Hospital, Wells, Somerset. D. S. SPENCE.

AMBULANCES

SIR,—Your leading article last week asks for information concerning the experience of doctors calling ambulances for their patients. As the Emergency Bed Service calls some 10,000 ambulances a year our experience may be of interest to you.

This service, as you know, deals only with patients who require immediate admission to hospital—immediate being deemed to mean within a day. A certain number of them are cases of desperate urgency, in which case the general practitioner authorises us to call for a " life and death ambulance," which, I understand, comes from the accident service and invariably leaves at once. In the remainder of the cases the patients are seriously ill and in need of treatment, but a short delay is probably of no serious consequence.

Whenever an ambulance is called the ambulance service is asked when the vehicle will leave, and the amount of delay indicated by this reply is the figure used in the following table. The cases tabulated have been selected at random, being the first 100 ambulances called in the months indicated.

SUMMARY OF DELAYS REPORTED ON 100 AMBULANCE CALLS MADE AT THE END OF EACH QUARTER TO THE LONDON COUNTY COUNCIL AMBULANCE SERVICE AND OTHER AMBULANCE SERVICES IN GREATER LONDON

Delay	December, 1946		March, 1947		June, 1947		September, 1947	
	L.C.C.	Others	L.C.C.	Others	L.C.C.	Others	L.C.C.	Others
None ..	37	66	44	68	65	73	59	83
15 min.	—	3	4	6	2	6	4	5
20 ,,	2	4	4	3	4	6	3	3
30 ,,	9	18	8	10	4	6	7	6
45 ,,	12	1	4	2	5	2	7	1
1 hour	28	6	17	10	18	7	13	2
2 hours	9	1	9	1	2	—	5	—
Over 2 hours	3	1	10	—	—	—	2	—
Total ..	100	100	100	100	100	100	100	100

It should be emphasised that where a doctor states that the case is desperately urgent an accident ambulance can be called, but some of the long delays shown must represent a great deal of anxiety to patients and doctors.

The ambulance services are at present suffering acutely from an inability to replace their ambulances, most of which are pre-war vehicles, and it is strongly to be hoped that the advent of the National Health Service will enable them to obtain high priority for replacements.

R. E. PEERS
Secretary, Emergency Bed Service.

10, Old Jewry, London, E.C.2.

Parliament

FROM THE PRESS GALLERY

National Assistance Bill

IN moving the second reading of this Bill [1] in the House of Commons on Nov. 24 Mr. A. BEVAN, Minister of Health, described it as the coping stone on the structure of our social services because it provided for the 400,000 people on outdoor relief, the 100,000 in institutions, and the 30,000 deprived children who still remained under the poor-law. Assistance, he continued, was in future to be a national responsibility and welfare a local responsibility. Therefore the National Assistance Board—as it was to be renamed—would provide financial help on a scale to be determined by regulations presented to Parliament by the Minister of National Insurance.

Turning to the people who would need special help, Mr. Bevan said the board would have the duty of providing maintenance of the blind while the local authorities would be responsible for schemes for their training and welfare. The welfare authorities would also have a special responsibility for the tuberculous. The system of mass radiography, and the encouragement of people in the early stages of the disease to give up their work and undergo treatment, would be continued and extended. The provision under which tuberculosis allowances ceased when it was found that the patient was incurable would be abolished. The treatment of pulmonary tuberculosis would be the responsibility of the National Assistance Board on the one side and the regional hospital boards on the other.

The proper care and welfare of the aged, Mr. Bevan declared, was the peculiar problem of modern society. As people grew older they became jealous of their independence and the Government had therefore decided that the workhouse must go. Instead the welfare authorities would be given power to establish special homes where our old people would enjoy the maximum of privacy and independence. " Bigness," Mr. Bevan said, " is the enemy of humanity," and the optimum limit for these homes must be about 25 to 30 residents, who should belong to mixed income groups. The character of the homes would be destroyed if merely the most indigent lived in them. Obviously it would not be possible for these hotels to spring up overnight; it would take some time to build and equip them. " However," concluded Mr. Bevan, " we have set our feet upon that road, and we intend to march upon it as quickly as possible."

Mr. WALTER ELLIOT was glad that the tuberculosis schemes were being maintained and extended. This would, he pointed out, place on the Government a still greater responsibility for finding the nursing staff to make sure that treatment was available. At present we could not staff all the existing beds, and as long as we were in that position it was not necessary, or even advisable, to talk about using more money for bricks and mortar provisions. Mr. Elliot was a little uneasy about some of the powers taken by the Bill. For instance any aged or infirm person could be removed from his house on the certificate of one medical officer of health supported by the court. Usually at least two certificates were necessary before a citizen could be removed from his house and detained under an indeterminate sentence or order.

Mr. SOMERVILLE HASTINGS looked upon the Bill as one of the best that had been introduced in the present Parliament. He was grateful that in future the cost of hospital treatment would not be counted as means, and that pensioners would be allowed some pocket money while they were in hospital. He hoped that the new homes would be situated as near as possible to where the old people had spent their lives. Dr. BARNET STROSS also welcomed the new provisions in regard to tuberculosis allowances. Doctors had had imposed upon them the duty of offering the death sentence to these

1. See *Lancet*, Nov. 8, p. 692.

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men and women. Now that they had a remedy it would make life much easier.

Medical Practitioners and Pharmacists Bill

In the House of Lords on Nov. 27 this Bill was read for a third time and sent to the Commons.

Punishment and Reform

The Criminal Justice Bill, said Mr. CHUTER EDE, in moving its second reading on Nov. 27, was not intended to weaken the effectiveness of the law, but to rationalise and make more flexible methods already available for dealing with convicted offenders. After describing the main provisions of the Bill, already set out in our columns,[2] Mr. Ede turned to the question of abolishing the death penalty. Since the war, he pointed out, there had been an increasing tendency for criminals to carry lethal weapons. At the time when they had to deal with a phenomenal increase in the cases of violent crime, and with the emergence of the armed criminal, our police forces were below establishment. The Government therefore could not regard the time as opportune to include in this Bill a provision for the suspension or abolition of the death penalty. But they recognised that this was a matter on which strong individual conscientious feelings were held, and that the division did not follow the usual party lines. If an amendment to deal with the death penalty was moved on the report stage of this Bill the Government would leave the final decision to a free vote of the House.

Viscountess DAVIDSON declared that the powers given to the courts to secure mental treatment for juvenile offenders on probation would only be effective if there were people capable of carrying out the treatments indicated in clause 4 of the Bill. Some idea of the personnel which would be required could be gathered from the following figures for all indictable juvenile offences in 1945: under 14 years, males 22,922, females 1500; 14 to 17 years, males 17,349, females 1732; 17 to 21 years, males 15,118, females 2324. There were at present some medical men and women capable of carrying out this work in the bigger centres, mainly in London, but their numbers barely covered the opportunities for work of this kind at present in existence. All clinics were overworked today, and no provision was made in the Bill, so far as she could make out, for adding to the numbers of trained medical or lay personnel. There were bodies who were quite capable of carrying out suitable training if grants could be made to them. It would probably be said that such provision came within the scope of the National Health Services Act rather than the Criminal Justice Bill. But there was no power given in the latter measure to the judiciary to require the Minister of Health to provide for the training and payment of officers for this purpose. So far as she could gather the maximum number of people who were ready trained to deal with juvenile offenders was about 50.

Dr. SANTO JEGER averred he was not one who liked to cry stinking fish about his own profession, but he regarded the medical attention in prisons as inadequate. It was often perfunctory, although he agreed that many prison medical officers were skilful, took their duties seriously, and gave their charges good medical care. But every medical officer in a prison should be compelled to take a diploma in psychological medicine and to attend refresher courses from time to time. Though a non-smoker himself he urged that prisoners should be allowed to smoke and such punishments as solitary confinement, flogging inside prisons, and the imposition of bread and water diet, should be abolished. He was especially opposed to the retention of flogging as the act of flogging was associated with a basis of sexual perversion, not necessarily deliberate and conscious. Its abolition he believed would lessen the brutal atmosphere which existed in so many of our prisons.

Dr. STROSS held the provisions relating to young offenders to be the most important part of the Bill. It we wanted to keep down the number of habitual criminals we must ensure that young offenders were treated in such a way that they never again appeared before the courts.

2. *Lancet*, Nov. 15, p. 725.

QUESTION TIME

Pensions for Psychotics

Replying to a question Mr. G. BUCHANAN, Minister of Pensions, stated that the statutory tribunals had determined 2100 appeals by men and women discharged from the Services against the rejection of pension under the broad heading of psychosis. Of these the tribunals have allowed 450.

Royal Commission on Population

Major E. A. H. LEGGE-BOURKE asked the Minister of Health when the report of this commission might be expected. —Mr. BEVAN replied: I am informed by the commission that owing to the delays in the tabulation of the family census, the report will not be ready until next year.

Medicine and the Law

Medical Report without Patient's Knowledge

Dr. R., chief medical officer to an Irish insurance company, was adjudged "guilty of infamous conduct in a professional respect" at a hearing in Ireland last month [1] for having asked a medical practitioner to furnish "confidentially" a medical report on one of his patients.

It appeared that the patient was an elderly woman whose daughter wished to take out a policy to cover the prospective expenses of her mother's funeral. The daughter gave the insurance agent the name of Dr. K., her mother's medical attendant. In due course Dr. R., acting for the company, applied to Dr. K. for a report on the mother's medical history. Dr. K. in answer refused the application and described it as "irregular and unethical." Dr. R. rejoined that his request was for the purpose of assisting the poorer classes to effect insurance on a member of the family so as to protect themselves against funeral expenses; he added that Dr. K.'s refusal was "antisocial." This exchange of epithets was ended by Dr. K. asking for the letter back so that the correspondence could be referred to the Medical Registration Council of Ireland for decision. Several months later he received a second application from Dr. R. of the same nature and apparently relating to the same patient. He then sent the letter to the council.

The charge formulated against Dr. R. was that he had asked Dr. K. to furnish, for reward, a private report respecting the past and present state of health of a patient without the knowledge or consent of the patient. Dr. R. in his evidence stated that he had been chief medical officer to the insurance company since 1932 and that it was the company's practice in such cases, at the request of the person who proposed to take out the policy, to ask the medical attendant of the insured to make a report. He stated that 98% of the doctors who were asked supplied these confidential reports. Questioned as to what happened if doctors refused, he said that "accasionally, very occasionally" doctors did not reply, and on his sending a reminder they answered that they regretted they could not accede to his request. That ended the matter. Asked how it happened that he had sent a second request to Dr. K., he answered that, when he sent the second letter, he would not have seen the first proposal; there might have been two different proposals from children of the patient living in different places.

In announcing the decision of the tribunal, the chairman said that the council took a very serious view of any action which might impair the patient's trust in the confidential nature of any information obtained by a medical attendant about his patient. The council considered that information should not be disclosed without the patient's knowledge or consent. The action of Dr. R. was endangering this confidence. The council, however, decided to postpone judgment until their meeting in two years' time. Before that date Dr. R. would be required to send to the registrar, for the use of the council, the names of professional and other men of standing who might be willing on application to testify to their knowledge of his professional behaviour in the interval.

1. *Irish Times*, Nov. 5.

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Obituary

JOHN FRASER

BT., K.C.V.O., M.C., M.D., CH.M. EDIN., LL.D., F.R.C.S.E.

WE have to record the death of Sir John Fraser, principal of the University of Edinburgh since 1944, and previously regius professor of clinical surgery. Both in surgery and in affairs he was a man of high ability, with a fresh and vigorous mind directed towards the future.

He was born in 1885 at the small town of Tain in Ross-shire, the son of James Fraser and Margaret Mackay.

Press Portrait Bureau

From school days at Tain Academy he went to Edinburgh and graduated in medicine with honours in 1907. Thereafter he was resident surgeon successively at the Royal Infirmary, the Sick Children's Hospital, and the Chalmers Hospital, till 1910 when he took his F.R.C.S.E. and CH.M. He also studied in Paris and Freiburg. His first honorary post was at the Sick Children's Hospital, to whose honorary staff he was elected in 1912; and at that time he did much work, both clinical and experimental, on tuberculosis of bones, extending his researches to the differentiation of human and bovine tubercle bacilli. In 1914 he produced his book on *Tuberculosis of the Bones and Joints in Children*, which was dedicated to his chief, Harold Stiles, and was well received both by colleagues and students. Further inquiry on these lines was interrupted by the war, and from 1914 to 1918 he served with the R.A.M.C., winning the Military Cross and a mention in despatches: in observations on traumatic shock he collaborated among others with Cuthbert Wallace, with whom he afterwards wrote *Surgery at a Casualty Clearing Station*. On returning to Edinburgh he was elected assistant surgeon to the Royal Infirmary, and his surgical interests widened further.

A fluent and resourceful lecturer, Fraser took pains to understand his audience so that they should understand him. The Edinburgh undergraduates of 1925 welcomed his appointment to the regius chair because he paid them the compliment of taking them seriously—addressing them indeed as equals who were entitled to be critics. They welcomed him too as a young man who had lately travelled their own road (with much distinction) and who had no use for the idea that the highest peak of Edinburgh's glory was touched in the days of Lister and Syme. Nor were they disappointed: the new professor had brilliance both as surgeon and teacher, and was true to the ideal of scientific practice imparted by Stiles his predecessor.

During his active years as a surgeon Fraser's fame spread widely. His book *The Surgery of Childhood*, which came out in 1926, was the first of its kind and a competent work. He lectured in Sydney and was made F.R.A.C.S.; he became an honorary fellow of the American College of Surgeons and of the American Surgical Society; his private practice grew; and his appointment as surgeon to the King in Scotland brought him a knighthood in the Royal Victorian Order in 1937. During the late war he was consulting surgeon to the Military Hospital, Edinburgh, and to the Royal Navy in Scotland, and in 1943 he was created a baronet. Throughout these years, however, his professional work was increasingly mingled with the affairs of the university and the nation. In a portrait sketch at the time of his appointment the university magazine, the *Student*, said:

"While talking to Professor Fraser, one receives the impression that his greatest triumphs are yet to come at the conference table. For he has the subtlety of Odysseus, grasps your argument beforehand, penetrates the thoughts which lie behind it, and gives you his answer in a choice confection of compliments. There is a strange disparity between the essential novelty of his thought and the semblance of orthodoxy which he throws over it. He loves to act the lion in the guise of the lamb, and this is the very quintessence of diplomacy."

He was a member of the Royal Commission on Licensing of 1930–31, of the consultative committee of the Army Medical Services, and of the scientific advisory committee of the Department of Health for Scotland. Much concerned about the conditions of student life, he helped to form the plans of his friend Sir Donald Pollock, who in 1943 gave about £250,000 in trust to stimulate and develop student activities. In 1944 he succeeded Sir Thomas Holland as principal.

The three years spent in this new work were characterised by intense devotion: no effort was spared to master the details of university problems great and small. Almost from the first, however, he was handicapped by ill health, leading to grave illness last year; and he was handicapped also, in a sense, by a Highland reserve and a shyness which in daily contacts made his courteous manner rather formal. Nevertheless in a time of great difficulty following the war he achieved much for which Edinburgh will long be grateful.

Sir John Fraser married Agnes Herald, of Duns, and they had a daughter and a son who succeeds to the baronetcy.

ALEXANDER MacCORMICK

K.C.M.G., M.D. EDIN., HON. F.R.C.S.

THE influence of Sir Alexander MacCormick on the development of surgery in this continent, writes our Australian correspondent, has been profound. A practical surgeon, by his judgment, skill, and anatomical approach to surgery, he taught by precept and example many thousands who were associated with him as assistants, house-surgeons, and students.

Born in 1856 at Taynish, in Argyllshire, MacCormick received his early medical education at the University of Edinburgh, where he was a class-mate of Sir Arthur Conan Doyle, David Orme Massey, and his life-long friend Dr. Robert Scot Skirving. After graduating M.B. in 1880, he became a demonstrator in physiology at Edinburgh and later house-surgeon at the Liverpool Royal Infirmary to E. R. Bickersteth, who had a great influence on his work. In 1883 he came to Australia under the ægis of his friend Anderson Stuart, as the first demonstrator in anatomy to the new medical school of the University of Sydney. To this period of anatomical research belongs his thesis on the musculature of the limbs of the Australian native cat, for which he was awarded the Edinburgh M.D. with gold medal in 1885.

Sydney Morning Herald

In the same year he was appointed assistant surgeon to the Royal Prince Alfred Hospital, Sydney, where he was one of the first to introduce antiseptic methods and the teachings of Lister. Here he laid the foundations of his great surgical reputation. Appointed to the senior staff in 1889, he worked actively at the hospital until he reached the retiring age in 1915; then he joined the staff of the St. Vincent's Hospital where he remained an active member of the staff until 1932. He was also a member of the staff of the Sydney Hospital and of the Prince Henry Hospital.

Although MacCormick was lecturer in surgery in the University of Sydney for over a quarter of a century he was not considered a good clinical teacher. But the two tributes which follow show that for some of his pupils at least this was not true. "He spent little time in bedside instruction," writes B. T. E., "but to those who followed him closely there was a great deal to learn

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and he was always ready to answer questions. In the operating-theatre there were large audiences of students and visiting practitioners. His skill and speed in the performance of intricate surgical dissections was unique and he became a master of almost every branch of surgery. Many, like myself, have established their practice upon his teaching and example."

J. S. takes up the tale: "It would be impossible to imagine anybody leading a more strenuous and useful life than MacCormick. His mental and physical stability was enormous, enabling him to outlast many a younger man. To his patients and to their tissues he was gentle and kind. His field of activity was the whole body, and he had an uncanny judgment and a superb dexterity. An excellent teacher of those who worked with him, he taught by example. Generous and charitable, he never allowed his right hand to know what his left was doing."

MacCormick was made an honorary fellow of the Royal College of Surgeons of England in 1900 and of the Royal College of Surgeons of Edinburgh in 1905, and he was a foundation fellow of the Royal Australasian College of Surgeons. He was knighted in 1913 and appointed K.C.M.G. in 1926. With Dr. Scot Skirving, he had served as consulting surgeon in the South African War with the New South Wales contingent, when he was mentioned in despatches. He also served from 1914 to 1917 in the Middle East and in France.

The volumes of the *Australasian Medical Gazette* from 1884 to 1906 bear testimony to his skill and ability, and in all he published more than 30 articles.

One of his best-known cases was that of a man who in 1888 had a V-shaped excision performed for a cancer of the lip. A year later, a considerable part of the lower jaw was removed for a recurrence, with a large part of the cheek and the submaxillary gland. Three and a half months later, the ramus of the jaw, part of the parotid, the pillars of the fauces, and the tonsil were removed. Four months later a further recurrence was treated. In 1892, the patient was well and was shown at a meeting of the Intercolonial Medical Congress in Sydney. Through the opening in the side-wall of the pharynx, it was possible to follow the movements of the epiglottis during swallowing. These movements were studied by Anderson Stuart, who, with MacCormick, described them in the *Journal of Anatomy and Physiology* in 1892.

MacCormick's attention to the patency of the whole biliary tract before closing the abdomen in gall-bladder surgery was meticulous and was one of his most practical teachings. He was at his best in intricate dissections involving the tongue, maxillæ, and glands of the neck. The operation he described in 1899 for removal of cancer of the tongue was well ahead of his time, while his operation for irreducible dislocation of the metacarpal joint of the thumb, by passing a tenotome through the back of the joint and cutting the thick anterior ligament against the phalanx, still remains the simplest and best method of meeting this difficult problem.

In 1926 he presented his private hospital, The Terraces, together with £25,000 and lands for its extension, to the Presbyterian Church of New South Wales, and it is now known as The Scottish Hospital. He was a member of the Royal Yacht Squadron and commodore of the Royal Sydney Yacht Squadron; when about seventy, he sailed his yacht *Ada* from England to Australia through the Panama Canal. On his retirement, he went to live at St. Brelade, Jersey, and he escaped internment by a few hours when the Channel Islands were invaded in 1940. After the war he returned, and it was there he died on Oct. 25.

ELIZABETH COWPER EAVES

M.D., B.SC. LOND., D.P.M.

Dr. Elizabeth Eaves, lecturer in physiology in the University of Sheffield and consulting neuropathologist to the South Yorkshire Mental Hospital, died on Nov. 21 after a short illness.

Holding her B.SC. she was appointed demonstrator in physiology at the University of Sheffield in 1909, and she continued to work in this department until her death, serving under four professors. In her chosen specialty of neurohistology she devised staining methods for nervous-system tissues. Colour-vision was another of her interests, and she had lately completed a paper presenting the results of years of detailed observations. From this work Dr. Eaves turned to medicine, taking her M.B. in 1922, the D.P.M. two years later, and her M.D. in 1925.

As president of the local association of the Medical Women's Federation Dr. Eaves for many years spared no effort to obtain equality for women students, especially on the question of resident student posts, and she undertook a follow-up of all the women students from Sheffield who had qualified in the last 30 years, to justify the existence of the woman medical student. She was also at one time corresponding secretary of the Medical Women's International Association.

During the world war she spent her university vacations doing locum appointments, mainly in hospitals for nervous diseases. Those who visited Dr. Eaves at her home discovered with appreciation her gifts as a pianist.

Public Health

Foul Rivers

ON the second reading of the River Boards Bill the Duke of Devonshire quoted Greek, somewhat to the confusion of *Hansard*. He was recalling what Herodotus recorded of the exemplary habits of the ancient Persians. One need not flinch from offering an English translation of the passage: "Because of their special reverence for rivers they neither urinate nor spit into a river nor wash their hands in it, not do they allow anyone else to do so."

Such respect for cleanliness, health, and amenities puts us to shame some 24 centuries later in an age when the water-borne sewage of cities and the poison of industrial effluents are allowed to contaminate our streams and estuaries. Even the new Bill, as its sponsors have to admit, does nothing in itself to check this appalling pollution. Its scope is invincibly modest. It is a typical "departmental" Bill, devoted to the mechanics of administration.

The Central Advisory Water Committee, of which Lord Milne has been chairman, have looked round England and discovered that there are 45 fishery boards, 53 catchment boards under the Land Drainage Act, and, in all, some 1600 bodies responsible for dealing with river pollution. The Milne Committee proposed to substitute 29 larger and more powerful authorities. The new Bill is not even so definite as that. New "river board areas" are to be mapped out presently by departmental order. It is not thought worth while to disturb the Port of London Authority's powers over navigation and pollution, the London County Council's powers of preventing flooding, or the supervisory jurisdiction of the Thames Conservancy. Consequently the Thames, Lee, and London areas are excluded from the Bill but may be brought in later by another set of departmental orders. The main purpose of the new Bill is to set up the projected river boards and to transfer to them the functions, powers, assets, and liabilities of the existing bodies. On any fresh provisions for enforcing the law, or for conserving water so that we do not witness the irrational sequence of floods and droughts, the Bill appears to be silent. But it was officially stated during the House of Lords debate that the Milne Committee has, at the Government's request, set up a subcommittee to examine what fresh legislation is required for coping with pollution. Thus, even in a period of streamlined law-making, we progress but slowly towards ending the scandal of our fouled rivers.

Shortly before the debate a school of porpoises was observed off Westminster. But the riparian residents of Chelsea and Chiswick cannot watch from their windows the leap of the salmon. Mature fish cannot survive the pollution of the Thames below London Bridge. Apart from the amenity of clean water, we lose a by no means negligible source of food-supply. In former centuries, it is sometimes said, such was the plenty that wages agreements used to stipulate that the agricultural labourer should not be obliged to accept salmon in lieu of money more than twice a week. Mentioned in the recent debate, and apparently accepted by the Master of Trinity in his *English Social History*, the story is heavily challenged by a contributor to *Notes and Queries* in the issue of Nov. 15. Whether it be true or false, the

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recent reports on the state of English rivers have left no doubt that the destruction of fish is wholesale and that it could be prevented. Clean rivers, of course, will cost money. It might cost £6 million, for example, to purify the waters of the Tyne, and many other social services such as housing and education will have priority in the queue for public expenditure. The River Boards Bill must be accepted as a first instalment, without prejudice to our demands for something more drastic to follow.

Poliomyelitis and Polioencephalitis

Notifications of poliomyelitis in the week ended Nov. 22 were 142 (186) and of polioencephalitis 3 (15). Figures in parentheses are those for the week ended Nov. 15. This decline is greater than in other recent weeks. The marked decline in notifications of polioencephalitis is of doubtful significance since there have been irregular fluctuations under this heading.

Infectious Disease in England and Wales

WEEK ENDED NOV. 22

Notifications.—Smallpox, 0; scarlet fever, 1812; whooping-cough, 1183; diphtheria, 220; paratyphoid, 4; typhoid, 3; measles (excluding rubella), 2233; pneumonia (primary or influenzal), 503; cerebrospinal fever, 30; poliomyelitis, 142; polioencephalitis, 3; encephalitis lethargica, 3; dysentery, 141; puerperal pyrexia, 100; ophthalmia neonatorum, 48; relapsing fever, 1. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 2 (0) from measles, 1 (1) from whooping-cough, 2 (1) from diphtheria, 57 (8) from diarrhœa and enteritis under two years, and 10 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 198 (corresponding to a rate of 26 per thousand total births), including 37 in London.

Births, Marriages, and Deaths

BIRTHS

BULMAN.—On Nov. 28, at Wallington, Surrey, the wife of Mr. J. F. H. Bulman, F.R.C.S.—a son.
CALDER.—On Nov. 24, the wife of Dr. Norman Calder—a son.
DOEY.—On Nov. 24, at Leigh-on-Sea, the wife of Mr. W. D. Doey, F.R.C.S.—a daughter.
DURBIN.—On Nov. 20, at Exeter, the wife of Mr. F. C. Durbin, F.R.C.S.—a daughter.
HUMBLE.—On Nov. 23, in London, the wife of Dr. J. G. Humble—a son.
MACDONALD.—On Nov. 21, the wife of Dr. G. G. Macdonald—a son.
MILLER.—On Nov. 13, in Bristol, the wife of Mr. Ashton Miller, F.R.C.S.—a son.
MILLES.—On Nov. 22, at Droitwich, the wife of Dr. Herbert Milles—a son.
MORTON.—On Nov. 24, at Nottingham, the wife of Dr. William Morton—a son.
PRATT.—On Nov. 27, at Cambridge, the wife of Dr. C. L. G. Pratt—a daughter.
RAW.—On Nov. 24, at Carshalton, Surrey, the wife of Mr. S. C. Raw, F.R.C.S.—a daughter.
SHAW.—On Nov. 21, at Norwich, the wife of Mr. R. E. Shaw, F.R.C.S.—a son.
SPEIRS.—On Nov. 23, at Nairobi, Kenya Colony, the wife of Dr. R. C. Speirs—a daughter.
WELBON.—On Nov. 27, at Ipswich, the wife of Dr. J. W. S. Welbon—a daughter.
WILKINSON.—On Nov. 26, at Leeds, the wife of Dr. P. J. Wilkinson—a daughter.

MARRIAGES

MONSARRAT—ADAMI.—On Nov. 22, at Bath, Keith Waldegrave Monsarrat, F.R.C.S., to Marie, widow of Dr. J. George Adami, C.B.E., M.D., F.R.S.
SHIRLEY—ROBERTS.—On Nov. 22, at Sawbridgeworth, Surgeon Lieutenant Malcolm Shirley, R.N., to Jean Valerie Roberts.

DEATHS

HATT.—On Nov. 22, at Ranaghat, Bengal, India, Mervyn Alexander Hatt, B.M. Oxfd, aged 44.
HERRING.—On Nov. 22, in London, Herbert Thomas Herring, O.B.E., M.B. Durh.
HIGGIN.—On Nov. 29, at Newton Abbot, Robert Francis Higgin, M.D. Camb.
HUNT.—On Nov. 22, in London, David Mackenzie Hunt, L.M.S.S.A.
RILEY.—On Nov. 28, at Ryde, Isle of Wight, Arthur Riley, M.B. Leeds, aged 78.
SIMPSON.—On Nov. 26, at Cambuslang, Scotland, Frank T. Simpson, M.C., K.I.H., M.B. Durh.

Notes and News

PETROL FOR THE DOCTOR

THE abolition of the basic petrol ration hits the practising doctor hard, because when he visits friends or goes to the pictures he must often rely on his car to bring him back in a hurry if he receives an urgent call. The British Medical Association has put this point to the Minister of Fuel and Power, and he has agreed that when a doctor undertakes a social or recreational engagement *and is on call to his patients*, having ensured that messages will reach him, the doctor can justly claim, if challenged by the police, that his car is being used in connexion with his professional duties. Regional petroleum officers are being informed of this decision; so presumably a doctor can claim a petrol allowance for social engagements while "on call." The British Medical Association has also learnt that doctors will be allowed petrol for attending local meetings of the association or of other professional bodies.

SOME DEVON MEDICAL WORTHIES

AT a meeting of the Devon and Exeter Medico-Chirurgical Society on Nov. 20, Mr. W. J. BISHOP, F.L.A., spoke of some of the notable medical figures of the south-west during the past three centuries. It was not surprising, he said, that Devonshire, which had produced such outstanding men of action in other spheres as Marlborough, Drake, Hawkins, Raleigh, Hooker, Gay, and Joshua Reynolds, should also have added many illustrious names to the annals of medicine.

Starting with Robert Vilvain, of Exeter, who published a book of epigrams in 1654, Mr. Bishop talked of Richard Spicer, Antony Salter, and Sir Simon Baskerville the Rich, who was buried in St. Paul's; of John Attwell who obtained spectacular cures by prescribing milk and apples, was renowned for piety and benevolence, and lived to a great age; of the "haughty and repulsive" John Bidgood, who, though professing the motto "use all men ill," nevertheless rendered to his patients every possible attention; and of Edmund Davie, "the great Æsculapius of his time" in the West Country. In the *Adventures of Sir Launcelot Greaves* Smollett immortalised the early career, first as a surgeon's apprentice and then as a naval surgeon, of James Yonge, of Plymouth. In later life Yonge was made a member of Surgeons' Hall without examination—a signal honour—became a fellow of the Royal College of Physicians (having first been assured that the "catechising should be plain and the fees low"), and was admitted to the fellowship of the Royal Society in 1702.

Mr. Bishop noted the close association between the physicians of Exeter and Exeter College, Oxford. Other Oxford colleges, however, educated some of them, notably William Musgrave who was first an undergraduate and later a fellow of New College. John Blackall and "the able, amiable and humane" Hugh Downman were Balliol men. The celebrated Sir George Baker, who discovered the cause of Devonshire colic, was educated at Eton and King's, Cambridge, and was probably one of the most elegant scholars of the 18th century.

Other famous—or notorious—characters touched upon by Mr. Bishop were John Huxham, James Parsons, John Shebbeare, Thomas Glass, John Mudge, John Wolcot, John Sheldon (the amateur balloonist), Bartholomew Parr, John Cunningham Saunders, Thomas Slapton, and the Budds of North Tawton. If and when the much-needed University of the South West comes into being, there can be no doubt, he said, that Exeter, with its long and distinguished medical tradition and its large hospital, should become a medical teaching centre.

SCIENTIFIC TREATMENT OF DELINQUENTS

ANNUAL reports are one of the blessings of peace, it seems; for many bodies which for years have been pursuing their chosen course as secretly as underground rivers are now bubbling out in print again. Among these is the Institute for the Scientific Treatment of Delinquency,[1] which reports its doings for the first time since 1940.

During the war the educational work of the institute developed considerably; besides university extension courses for the diploma in social studies, more courses have been held for those training to be probation officers and for other social science students.

1. Report for the year ended Dec. 31, 1946. Clinic and offices: 8, Bourdon Street, Davies Street, London, W.1.

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In May, 1946, the institute moved into new quarters in Bourdon Street, and this made it possible to extend both clinical and educational work. There were 1071 attendances at the psychopathic clinic, and 160 new cases came for treatment—about the same number as in 1938. But the demand for the clinic's services outruns its capacity, and it is estimated that at least five times as many cases would be dealt with if money was available to pay for medical and other technical staff. Even a small additional whole-time or part-time paid technical staff, it is thought, would make this possible, and also ensure that better use was made of valuable data collected in the records.

The conditions covered include mental defect, low intelligence, psychosis and borderline psychosis, psychoneurosis, character disorders, organic disorders, and alcoholism. Patients are referred to the institute by courts, doctors, clinics, philanthropic societies, relatives and friends, and social workers; and some patients come of their own accord. Medical, psychological, and social treatment is undertaken, and every patient is thoroughly examined physically and mentally; his intelligence is tested and his social history is studied by a psychiatric social worker. The results are surveyed and discussed by one of the medical directors, and a comprehensive report of the findings, with recommendations, is sent to the court or other body which referred the patient to the clinic. Dr. Denis Carroll, Dr. Frederick Dillon, Dr. Edward Glover, Dr. T. Rowland Hill, Dr. Emanuel Miller, and Dr. J. D. W. Pearce are the directors of the clinic, and there are in addition 19 other doctors on the medical staff. New subscribers are needed to help this careful and useful piece of voluntary work.

RADIOACTIVE TESTOSTERONE

WITH the aid of the radioactive isotope of carbon, C^{14}, radioactive testosterone, the first example of a synthetic radioactive sex hormone, has been produced in the department of chemistry at Harvard University.[1] It is expected that this will lead to advances in the knowledge of the interrelations of steroid hormones and cancer.

MEDICAL SUPPLIES

FROM Dec. 1 the Ministry of Health will take over from the Ministry of Supply responsibility for purchasing medical supplies for the Government. This transfer is in conformity with the general policy of handing over various war-time functions of the Ministry of Supply to the appropriate Government departments. The functions transferred include the purchase and inspection of Government requirements of drugs, dressings, and medical and surgical equipment, together with responsibility for sponsorship of firms producing these supplies for civil needs. For the present, the regional controllers of the Ministry of Supply will continue, on behalf of the Ministry of Health, to deal with matters normally considered at the regional level. All correspondence formerly addressed to the Directorate of Medical Supplies (including Penicillin Production Control), should from Dec. 1 be sent to the Secretary, Ministry of Health, Whitehall, S.W.1. The telephone number (Abbey 7788) remains unchanged, but the new telegraphic address will be "Localise, Parl, London."

SICK-BAY FOR CIVIL SERVANTS

A SICK-BAY was this week opened at Moray Lodge, Campden Hill, for civil servants of the lower-paid groups appointed to posts in the London area and living in hostels or lodgings. The sick-bay will be administered by the Ministry of Health, and the British Red Cross Society will be responsible for its day-to-day management. The Treasury Medical Adviser and his staff will act as medical officers, but private doctors will, of course, be free to visit their patients in the sick-bay. Cases of serious or notifiable infectious disease will not be accepted, as the sick-bay will deal only with the home-nursing type of case.

University of Oxford

On Nov. 22 the degree of D.M. was conferred on D. M. T. Gairdner (in absentia), and the degree of B.M. on D. M. L. Doran.

Royal Society of Medicine

The William Gibson research scholarship has been awarded to Dr. Alice Palmer, of Sydney, for her proposed research on the circulation in pregnancy.

1. Turner, R. B. *Science*, 1947, **106**, 248.

Royal College of Physicians

The by-laws have been amended to give members more voice in the affairs of the college. In future at least two general meetings of members must be held each year, and a standing committee has been set up to concern itself with their interests. At the first statutory meeting, held on Nov. 27, with Lord Moran, the president, in the chair, 133 members were present. The following were appointed to serve on the standing committee: Lord Moran (ex-officio), Dr. W. R. S. Doll (chairman), Dr. M. J. McArdle (secretary), Dr. H. S. Morley, Dr. E. Halliwell, Dr. J. Holmes, Dr. J. F. Bromley, Dr. P. L. Mollison, Dr. W. J. O'Donovan, Dr. J. H. Hunt, Dr. E. Bywaters, Dr. C. Wilson, Dr. G. E. F. Sutton, Dr. A. Leishman, Dr. E. Darmady, Dr. K. A. Latter, Dr. R. Johnstone, Dr. R. Cove-Smith, Dr. J. R. Forbes, Dr. Helen Dimsdale, Dr. W. E. Gibb; and Dr. J. F. Loutit and Dr. L. W. Batten, who were also elected representatives on the council of the College.

London Hospital

Dr. A. G. Leatham has been appointed Sherbrook research fellow to the cardiac department of the hospital.

Pharmaceutical Society of Great Britain

On Thursday, Dec. 11, at 7.30 P.M., at 17, Bloomsbury Square, London, W.C.1, Mr. Adrien Albert, PH.D., will speak on protein structure and its pharmaceutical significance.

Medical Defence Union

Dr. P. H. Addison has been appointed assistant secretary to the union. Dr. Addison, who qualified in 1933, has served with the I.M.S. for ten years.

Gordon Hospital, London

On Dec. 2, the Duchess of Kent formally opened this hospital. The hospital which was first started in 1884, completed its rebuilding scheme in 1939, but during the late war it was requisitioned as a hostel for troops and its equipment transferred to the Victoria Hospital, East Grinstead.

Bearsted Memorial Hospital

The new unit of this hospital at Lordship Road, Stoke Newington, N.16, is now open for the reception of patients irrespective of religion or creed, and the board ask that emergency cases and abnormalities should be referred to the hospital for admission and antenatal treatment.

N.A.P.T. Colonial Scholarships

The National Association for the Prevention of Tuberculosis have awarded scholarships to the following for training in Great Britain in 1948:

Dr. Motala, in charge of Kibongoto Tuberculosis Hospital, Moshi, Tanganyika; Dr. V. E. Donawa, grade A medical officer (tuberculosis), medical department, Trinidad; Dr. M. H. Sherif, medical inspector in Sudan Government.

International Association for Prevention of Blindness

An honorarium of $1000 to promote research work on ophthalmology is offered through the American members of the staff of this association.

The award will be made in connexion with the 16th Concilium Ophthalmologicum, and the jury will consist of the officers and executive committee of the association. Papers may be presented by any responsible research-worker. The subject is to be Simple Non-inflammatory Glaucoma and may include anything definitely relative to the question. The matter must be new and of such value, in the judgment of the jury, as to merit this recognition. Papers may be written in English or French; they should be either unpublished or else published between the present date and Oct. 15, 1949; and they should reach the secretary of the association, 66, Boulevard St. Michel, Paris, not later than Oct. 15, 1949.

Scottish Defence Union's Report

During the year 1946–47 the membership of the Medical and Dental Defence Union of Scotland increased from 5742 to 5905. The annual report gives the assets as £34,882, representing a reserve of £5 18*s.* 1*d.* per member. During the past year the main grounds in respect of which claims arose were: error in prescription; amputation of the wrong finger; omission to remove tourniquets after operation; failure to X ray fracture; X-ray, diathermy, and radiant-heat burns; failure in swab check after operation; wrongful certification of insanity; negligence in diagnosis; negligence after unsuccessful dental extraction; and libellous remarks to relative of patient.

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Pan-American Congress of Ophthalmology

Among the guests who are to address the third Pan-American Congress of Ophthalmology, which is to be held in Havana from Jan. 4 to 10; are Sir Stewart Duke-Elder whose subject will be Penicillin in Ophthalmology, and Dr. Elizabeth Cass (Gibraltar) who will speak on Strabismus.

Deferred Call-up of Laboratory Trainees

Under an arrangement announced by the Ministry of Health, trainee laboratory technicians may apply for deferment of call-up until their training has been completed. Deferment is to be granted subject to provisos as to age, suitability of the training provided, and satisfactory progress in training.

Royal Society of Arts

On Monday, Jan. 26, Dr. C. H. Andrewes, F.R.S., will speak on Progress in the Fight against the Common Cold, on Feb. 2, Prof. A. C. Frazer on the Metabolism of Fats, and on Feb. 9, Sir Jack Drummond, F.R.S., on Fats in the Life of the Nation. All these Cantor lectures will be given at the house of the society, John Adam Street, Adelphi, London, W.C.2, at 4.30 P.M.

Middlesex Hospital Arts Society

This society is holding their annual exhibition in the board-room of the hospital, London, W.1, on Dec. 15-18, from 11 A.M. to 6 P.M. (4 P.M. on the 17th). One of the main sections will be work by members of the Photographic Society, and Prof. J. McIntosh and Dr. K. B. Merling will show electron photo-micrographs, and Mr. W. H. S. Cheavin, F.R.M.S., philatelic research by X rays.

Chairmanship of Food Investigation Board

Sir Frank Engledow, F.R.S., Draper's professor of agriculture in the University of Cambridge, has been appointed chairman of the board in succession to the late Sir Joseph Barcroft, F.R.S. The board, which has research stations at Cambridge, Aberdeen, and East Malling, Kent, is concerned with the conduct of research into the properties and behaviour of foodstuffs, and the scientific problems involved in their storage and transport.

Ling Physical Education Association

A conference on remedial gymnastics will be held at Sloane School, Hortensia Road, Chelsea, S.W.10, from Monday, Dec. 29, to Friday, Jan. 2. The aim of the conference is to emphasise the importance of the prevention and cure of minor defects in school-children; to stimulate interest in the specialised treatment of those more seriously handicapped; and to give a picture of medical gymnastics as carried out in this country. The medical speakers will include Dr. Harold Balme (Place of the Remedial Gymnast in the National Health Scheme), Dr. Doris Baker (Postural Foot Defects), Prof. A. B. Appleton (Feet and Posture), Dr. F. S. Cooksey (Postural Defects of the Spine), Miss M. Forrester-Brown (Team Work in the Prevention and Cure of Postural Defects), Dr. J. L. Dunlop (Place of the Educational Gymnast in a School Health Service). Further information may be had from the secretary of the association, Hamilton House, Bidborough Street, W.C.1.

Appointments

BALLARD, S. I., L.R.C.P.E.: medical superintendent, Isle of Man Mental Hospital.

FREEMAN, PEARL, M.B. Glasg.: asst. M.O., Oldbury.

LISHMAN, F. J. G., M.D. Lond., D.P.H., D.L.O.: senior M.O., Essex.

MADDOCKS, S. A., M.R.C.S., D.M.R.E.: radiologist, Hillingdon County Hospital, Middlesex.

MICHIE, WILLIAM, M.B. Aberd., F.R.C.S.E.: asst. surgeon, Aberdeen Royal Infirmary.

NICHOLAS, C. P., F.R.C.S.: surgeon, Evelina Hospital, London.

ROBERTSON, J. M., M.B. St. And.: junior asst. pathologist, The Victoria Infirmary of Glasgow.

STEWART, A. S. R., M.B. Glasg.: asst. physician, County Hospital, Ashton-under-Lyne, Lancs.

WARD, J. A., M.R.C.S.: M.O., Tanganyika, Colonial Service.

The Royal National Throat, Nose, and Ear Hospital, London:

Assistant Surgeons:

DOEY, W. D., B.A., M.B. Camb., F.R.C.S., D.L.O.

ROTTER, K. G., M.B. Lond., F.R.C.S., D.L.O.

Diary of the Week

DEC. 7 TO 13

Monday, 8th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. W. F. Harper: Anatomy of the Nose and Paranasal Sinuses.
5 P.M. Prof. R. Hare: Source and Transmission of Wound Infection.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Prof. John Ryle: Teaching and Research in Social Medicine.

Tuesday, 9th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Sir Arthur MacNalty: Medical Department of the Local Government Board. (First FitzPatrick lecture.)

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. E. L. Patterson: Elbow Joint.
5 P.M. Dr. L. Foulds: Development and Limitation of Malignancy, (i) experimental pathology.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Psychiatry.* Miss Anna Freud, Dr. Clifford Scott, Dr. D. W. Winnicott, Dr. John Bowlby: Aggression in relation to Emotional Development.
5.30 P.M. *Experimental Medicine.* Dr. R. A. Kekwick, Dr. N. H. Martin: Plasma Protein Fractions.

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. I. Muende: pathological demonstrations.

CHELSEA CLINICAL SOCIETY
7 P.M. (South Kensington Hotel, 47, Queen's Gate Terrace, S.W.7.) Mr. T. A. Cockburn, F.Z.S.: Treatment of Disease in Wild Animals.

MIDDLESEX COUNTY MEDICAL SOCIETY
3 P.M. (Ashford County Hospital.) Dr. K. D. Keele: Diseases of the Abdominal Aorta and its Branches. Dr. A. G. Signy, Major B. E. Tomlinson: Chronic Appendix.

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Dr. D. M. Horstmann (Yale University): Epidemiology of Poliomyelitis.

Wednesday, 10th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. F. Wood Jones, F.R.S.: Perineum.
5 P.M. Dr. Foulds: Development and Limitations of Malignancy; (ii) clinical applications.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Comparative Medicine.* Dr. P. H. Gell, Mr. H. B. Parry, M.R.C.V.S.: Nutrition and Resistance to Infection.

Thursday, 11th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Sir Arthur MacNalty: Foundations of the National Health Service. (Last FitzPatrick lecture.)

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. G. A. Harrison: Interpretation of Tests of Renal Efficiency.
5 P.M. Prof. R. J. V. Pulvertaft: Pathology of Poliomyelitis.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
7.30 P.M. Dr. J. L. McLetchie: Control of Sleeping-sickness in Nigeria.

INSTITUTE OF DERMATOLOGY
5 P.M. Dr. H. W. Barber: Lichen Group of Eruptions.

Friday, 12th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. Harrison: So-called Acid-base Blood Balance.
5 P.M. Prof. W. D. Newcomb: Gastric Ulcer and Carcinoma.

ROYAL SOCIETY OF MEDICINE
8 P.M. *Radiology with the Faculty of Radiologists and the British Institute of Radiology.* Mrs. E. K. Dawson, Prof. R. W. Scarff, Mr. R. B. C. Ledlie, Sir Stanford Cade: Carcinoma of the Breast.

LONDON CHEST HOSPITAL, Victoria Park, E.2
6 P.M. Mr. J. W. S. Lindahl: Sinus Infection in Chest Diseases.

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh
8 P.M. Prof. R. W. B. Ellis: Effects of War on Child Health.

Saturday, 13th

ROYAL SOCIETY OF MEDICINE
10 A.M. *Radiology with the Faculty of Radiologists and the British Institute of Radiology.* Dr. R. McWhirter, Dr. Clemmison (Copenhagen): Carcinoma of the Breast.

BIOCHEMICAL SOCIETY
11 A.M. (London School of Hygiene, Keppel Street, W.C.1.) Symposium on the Biochemical Reactions of Chemical Warfare Agents.

THE British Medical Association Handbook for 1947–48 contains in compact form useful information about the officers, membership, constitution, and publications of the association, and it also summarises the more important decisions of the representative body upon matters of policy.

THE address of the home division of Messrs. Burroughs Wellcome & Co. will be 183–193, Euston Road, London, N.W.1 (Euston 4477), from Dec. 15. The same address will apply to their overseas division from Dec. 21.

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ABSORPTION OF PENICILLIN GIVEN BY MOUTH

H. C. STEWART
M.A., M.D. Camb., Ph.D. Lond.
LECTURER IN PHARMACOLOGY AND THERAPEUTICS

J. R. MAY
B.A., M.B. Camb.
ASSISTANT CLINICAL PATHOLOGIST

ST. MARY'S HOSPITAL, LONDON

From the Department of Physiology and the Inoculation Department of St. Mary's Hospital, London

AMONG the few disadvantages of penicillin therapy is the very uncertain response of infections to treatment with the drug given by mouth, as compared with the success of sulphonamides by that route. The first attempt to administer penicillin in this way was reported by Abraham et al. (1941), but little has since been published in this country on the subject, perhaps because the impression obtained from many of the earlier reports was that the only factor concerned in the failure of the method was the destruction of penicillin by the acid in the stomach, a view which is still widely held. Various alkalis have been used to combat the acidity of the gastric juice, but the results have been equivocal and rarely substantially better than when alkalis were not used. In no case have the blood-levels obtained been so high as those constantly found after intramuscular injections of the same doses. The final doubt was thrown on the suggestion that acid was the only factor by McDermott et al. (1946), who showed that no better absorption was obtained with penicillin by mouth in patients with achlorhydria.

In many of the reports the information obtained about the absorption of penicillin given by mouth has come largely from cases under treatment. Many of these, however, were cases of gonorrhœa (Paul et al. 1945, György et al. 1945), the causal organism of which is one of the most sensitive to small concentrations of penicillin. Since the doses given by mouth in these cases were very large, it is not surprising that the results were good, even though only a small fraction of the dose may have been absorbed.

In the present investigation we have tried to determine the relative importance of the factors governing the absorption of penicillin given by mouth. No attempt was made to treat actual infections; all the results were obtained in normal healthy adults, most of whom were men of 20–40 years. It has been shown by Henderson and McAdam (1946) and Buchanan (1946) that babies under 6 months of age may absorb penicillin by mouth better than adults, but we have not investigated this point.

In all the experiments described below, except when duodenal intubation was adopted, the volume of water used for the administration of the penicillin was about 120 ml. or 4 oz. (half the capacity of a 250 ml. beaker). This amount was a reasonable compromise, because, while it did not dilute the penicillin unduly, it was sufficient, it was hoped, to allow the dose to pass rapidly through an empty stomach and to lessen the taste of the penicillin, which some subjects found obnoxious.

TABLE I—EFFECT OF FOOD ON PENICILLIN ABSORPTION

Subject no.	Blood-penicillin level (unit/ml.)				
	On empty stomach	With food	After food		
			1 hr.	2 hr.	3 hr.
1	0·06	0·03	0·06	0·06	0·06
2	0·06	0	0	0·03	0·05
3	0	0	0	0	0
4	0·06	0	0	0	0·05
5	0·02	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0·2	0	0	0·06	0·13
9	0	0	0	0	0
10	0	0	0	0	0
11	0·06	0	0	0·13	0·06
12	0	0	0	0	0
13	0·13	..	..	..	..
14	0	..	..	..	..
15	0·05	..	..	..	..
16	0	..	..	..	..

All readings were the highest obtained after 15,000 units of penicillin had been taken. Blood was tested at 20 min., 40 min., 1 hour, 2 hours, and 3 hours after administration of penicillin.

Sublingual penicillin had been tried before but proved unsatisfactory, mainly because of the extremely disagreeable taste, which gave rise to copious salivation and made it impossible to retain the tablet in situ for more than a few seconds. Now that purer penicillin with a less obnoxious taste was obtainable it was found possible to keep 15,000 units/0·15 ml. under the tongue for fifteen minutes without swallowing. Out of 8 experiments in 5 persons, only 2 gave a blood-penicillin level in one specimen in each case, the rest showing no absorption. This was not, therefore, considered a practical method.

ESTIMATION OF PENICILLIN

In Blood.—In the early experiments the method used for estimating blood-penicillin levels was that described by Fleming (1944), using hæmolysis of blood by a streptococcus as the indicator. Subsequently Fleming and Smith (1947) improved this method by substituting a mixture of glucose, phenol red, and serum water for the saline diluent and red cells. This method was used for the experiments in the latter half of our investigation.

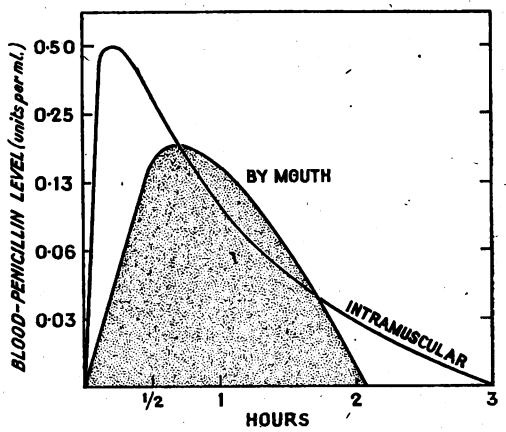

Fig. 1—Variation in absorption (shaded area) observed in 16 persons after a dose of 15,000 units of penicillin by mouth on an empty stomach, compared with a typical curve of blood-penicillin levels produced by the same dose of penicillin given intramuscularly.

In Urine.—The penicillin content of the urine specimens was estimated on agar plates by the filter-paper disc method, with the Oxford H staphylococcus as the test organism.

Other methods used are described with the relevant experiments.

EFFECT OF FOOD

It was necessary first to ascertain whether penicillin should be given on an empty stomach—i.e., whether food in the stomach interferes with absorption. If so, it was essential to know what interval should elapse between the taking of food and the administration of the penicillin.

For this purpose 12 persons each swallowed 15,000 units of penicillin on five separate occasions at different times in relation to food. This dose is small in comparison with those recommended for therapeutic use by mouth; but, since the penicillin was not being used for treatment, there was no object in giving a bigger dose. Further, with a small dose it is easier to appreciate small differences of absorption in relation to food, while at the same time it is easier to differentiate the good from the bad absorber.

The penicillin was given on an empty stomach; with food; and one, two, and three hours after food. It was impracticable, under present conditions, to control the type of food eaten, but by giving the penicillin in relation to breakfast this difficulty was to some extent obviated, since

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TABLE II—PENICILLIN STABILITY IN GASTRIC JUICE AT VARYING pH (SERIES I)

Gastric-juice specimen no.	Concentration of penicillin in buffer (unit/ml.)			
	A	B	C	D
1	0·75	0·06	0·06	0·04
2	1·0	0·25	0·25	0·18
3	0·75	0	0	0
4	0·75	0·25	0·25	0·25
5	0·75	0	0	0
Control	0·75	0·75	0·75	0·5

A, immediately after mixing.
B, after an hour at pH 3 or less.
C, after a further half-hour at pH 6–7.
D, after a further hour at pH 8.

this meal was the one which varied least. No food was allowed until two hours after the penicillin had been given.

Table I lists the highest blood-penicillin level for each of the 12 persons and for 4 other persons given penicillin on an empty stomach only.

Fig. 1 shows the variation in absorption in 16 persons who had each taken 15,000 units of penicillin by mouth on an empty stomach compared with a typical blood-penicillin curve produced by the same dose of intramuscular penicillin.

The highest blood-penicillin levels found in 9 persons who had taken 20,000 units of penicillin by mouth on an empty stomach were as follows:

Subject no. ..	1	2	17	18	19	20	21	22	23
Blood-level (u./ml.)	0·13	0·18	0·06	0·06	0·13	0·05	0·04	0·03	0·07

Blood was tested 20 min., 40 min., 1 hour, 2 hours, and 3 hours after administration of penicillin.

Since these results showed that the best absorption was almost always obtained when food was withheld, all subsequent experiments were performed on an empty stomach, except when the contrary is stated.

EFFECT OF pH OF GASTRIC JUICE

To assess the importance of the pH of the gastric juice, in-vitro experiments were carried out with juice of various acidities, instead of plain acid solutions, to imitate more closely in-vivo conditions. Three series of experiments were performed, the technique being basically the same in each; 2 ml. of each specimen of gastric juice was taken and 0·1 ml. of penicillin (1000 units/ml.) was added, making a final concentration of 50 units/ml.

Before each estimation a 10 c.mm. aliquot was taken and added to 1 ml. of nutrient broth. This diluted the penicillin to a strength suitable for titration and at the same time buffered the acid to a neutral and penicillin-stable pH. After the addition of the penicillin to the gastric juice all specimens were kept at a temperature of 37°C, from which they were not removed until the end of the experiment, and the removal of specimens for titration and their dilution in buffer were also carried out at this temperature.

In each series of experiments a control was prepared by mixing equal quantities of each specimen of gastric juice,

TABLE III—PENICILLIN STABILITY IN GASTRIC JUICE AT VARYING pH (SERIES II)

Gastric-juice specimen no.	pH	Concentration of penicillin in buffer (unit/ml.)					
		A	B	C	D	E	F
6	1·24	1·0	0·1	0·06	0	0	0
7	1·76	0·5	0·125	0·06	0	0	0
8	2·11	0·5	0·25	0·125	0·1	0·06	0
Control	6·5	0·5	0·5	0·5	0·5	0·5	0

A, immediately after mixing.
B, after 10 min. incubation at 37°C.
C, „ 20 „ „ „ „
D, „ 30 „ „ „ „
E, „ 40 „ „ „ „
F, „ 1 hour „ „ „

and 2 ml. of this was adjusted with *N*/10 NaOH to pH 6–7. This specimen was then tested exactly as the others.

Series I

Five specimens of gastric juice were used, and the pH of each with universal indicator was 3 or less.

Incubation was carried out for an hour at acid pH and then for half an hour at pH 6–7 after adjustment with alkali, and finally for a further hour at pH 8 after adding more alkali. In this way a time greatly in excess of that in which the penicillin could remain at these pH levels in the body was covered.

Titrations were carried out immediately after mixing, after an hour's acid incubation, after half an hour of neutrality, and after an hour at pH 8. The results are shown in table II.

Series II

Since the acid hydrolysis during the first hour from the above experiments was most important, further specimens of gastric juice were investigated and specimens were taken at short intervals during an hour's acid incubation only.

In this series the pH of each specimen was measured more accurately with a glass electrode. The results are given in table III.

Series III

Further specimens of gastric juice were selected to cover the less acid range not included in the previous series.

The pH of each of these specimens was also measured with a glass electrode. The results are given in table IV.

SELECTIVE ABSORPTION

Owing to the varied reports on the absorption of penicillin given by mouth it was thought advisable,

TABLE IV—PENICILLIN STABILITY IN GASTRIC JUICE AT VARYING pH (SERIES III)

Gastric-juice specimen no.	pH	Concentration of penicillin in buffer (unit/ml.)					
		A	B	C	D	E	F
9	2·0	0·5	0·25	0·175	0·125	0·1	0·04
10	2·9	0·5	0·5	0·5	0·5	0·35	0·25
11	4·2	0·5	0·5	0·5	0·5	0·5	0·35
Control	6·7	0·5	0·5	0·5	0·5	0·5	0·5

A, B, C, D, E, and F as in table III.

before proceeding further, to investigate the possibility that penicillins I, II, III, and K might be absorbed to different extents. If this were so, differences in the content of these types in the different batches of commercial penicillin might explain the very variable results reported by different workers.

Because of the impossibility, when these experiments were carried out, of obtaining pure samples of the different penicillins for this purpose, the following experiment was designed.

Penicillin that had been excreted in the urine was extracted and readministered. This penicillin, having been through the body once, should all be potentially absorbable; hence, if any selective absorption occurred, the urinary excretion of penicillin should be considerably greater after a dose of this reclaimed penicillin than after the same dose of ordinary commercial penicillin.

Four persons each swallowed 500,000 units of commercial penicillin which contained unknown quantities of the various types. The urine passed by each person during the next 24 hours was collected and the penicillin excretion estimated; all samples were then pooled and the penicillin extracted.

The total amount recovered was 70,000 units, which was only sufficient for four experiments using 15,000 units in each. It was therefore decided to select 2 persons (the best and the worst absorbers of the original 4), give each of them 15,000 units, and estimate again the total amount of penicillin excreted in the urine of each.

The excretion of penicillin after an intramuscular injection is about 60% of the original dose (Abraham et al. 1941, Rammelkamp and Keefer 1943). The amount of penicillin absorbed from a dose of 15,000 units

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TABLE V—COMPARISON OF PENICILLIN ABSORPTION FROM PLAIN GELATIN CAPSULES AND FROM AQUEOUS SOLUTION, EACH CONTAINING 100,000 UNITS

Subject no.	Vehicle	Blood-penicillin levels (unit/ml.) at various times					
		½ hr.	1 hr.	2 hr.	3 hr.	4 hr.	5 hr.
1	Water	0·75	0·5	0·13	0·07	0·03	0
	Capsule	0·3	0·5	0·13	0·06	0·04	0
2	Water	0·5	0·5	0·25	0·13	0·01	0
	Capsule	0·25	0·13	0·04	0	0	0
3	Water	0·35	0·25	0·06	0·04	0·01	0
	Capsule	0·13	0·06	0	0	0	0
6	Water	0·5	0·13	0·03	0	0	0
	Capsule	0·25	0·2	0·06	0·03	0	0
8	Water	..	0·5	0·5	0·06	0	0
	Capsule	1·0	0·5	0·13	0·06	0·03	0
9	Water	0·25	0·35	0·07	0·03	0	0
	Capsule	0·25	0·5	0·06	0	0	0

given by mouth would therefore be indicated by the excretion of about 10,000 units. Excretion of a smaller amount would indicate incomplete absorption.

The results of these experiments (fig. 2) show that the reclaimed penicillin, when administered a second time, gave no better results than did the same dose of commercial penicillin in the control experiment.

CAPSULES

Penicillin in enteric-coated capsules has been used in the past to avoid the destructive effect of the gastric acidity (Burke et al. 1945). Our experiments showed that the effect of pH was not very important and could easily have been overcome by the use of capsules designed to disintegrate in the gut and not in the stomach.

To assess the value of this procedure, a few experiments were carried out on the best absorber in our series, who swallowed capsules with the same dose in each.

These had been variously coated by formalin-hardening process to dissolve some in 2–10 min., some in 1½ hours, and some in 3 hours. These times were known from control experiments in which some of the capsules of each kind had been swallowed but barium sulphate had been substituted for penicillin and the dissolution time determined by radiography.

The results (fig. 3) showed that blood-penicillin levels were progressively lower the farther down the gut the capsule dissolved. Since the best results were obtained with the untreated capsule, it was necessary to determine whether this method had any advantage over the administration of penicillin in water.

Six persons swallowed 100,000 units of penicillin on two occasions, the first in water and the second in an untreated gelatin capsule, in each case on an empty stomach. The results are shown in table v.

In view of all these results it is not surprising that the use of capsules has been abandoned.

PENICILLINASE

To investigate the relative importance of penicillinase among the various destructive factors in the intestine, samples were obtained of the bacterial flora at different levels in the gut. Any bacteria isolated were tested for the production of penicillinase after 24 hours' growth in nutrient broth. A penicillin-agar (2 units/ml.) plate, sown all over with Oxford H staphylococcus, was used. The solutions to be tested were placed in porcelain cylinders standing on the medium. The presence of penicillinase was shown by growth of staphylococci round the cylinders after incubation.

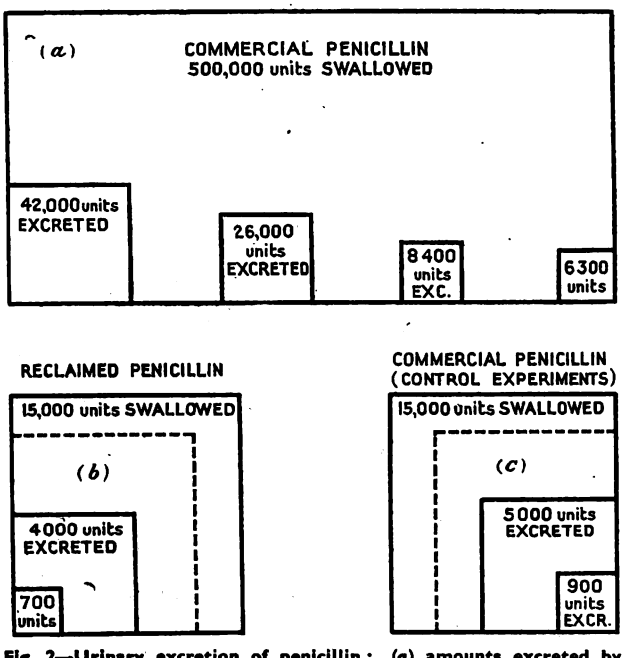

Fig. 2—Urinary excretion of penicillin: (a) amounts excreted by 4 persons after taking 500,000 units by mouth; (b) amounts excreted by 2 persons after taking by mouth a dose of 15,000 units of penicillin reclaimed from urine; (c) amounts excreted by same 2 persons after taking by mouth a dose of 15,000 units of commercial penicillin. The areas enclosed by the interrupted lines represent the approximate amounts that should have been excreted if all the penicillin had been absorbed.

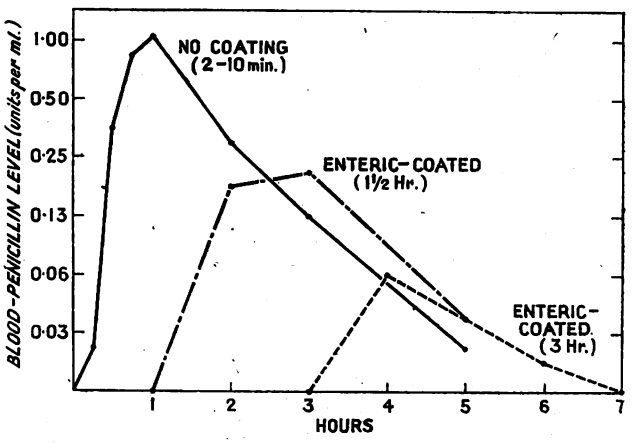

Fig. 3—Blood-penicillin levels obtained from a person who swallowed 100,000 units of penicillin on three occasions in gelatin capsules with different degrees of enteric-coating.

Two methods were adopted to obtain samples of gut contents: from the upper part of the duodenum by direct intubation (see below), and from the jejunum and ileum by the introduction and withdrawal of sterile nutrient broth through the gut wall at operation, with a hypodermic syringe and fine-bore needle. Some collateral information was obtained by direct culture of the contents of the rat's intestine at various levels.

Results.—In 7 samples of duodenal contents no penicillinase-producing organisms were found. In 2 cases specimens were taken from about 2 ft. distal to the duodenojejunal flexure and about 3 ft. proximal to the ileocæcal junction. No penicillinase-producing organisms were found in either jejunal specimen or in the first ileal specimen. The second ileal specimen contained a coliform organism which produced only 2 units/ml. of penicillinase in twenty-four hours. Various organisms were cultured from different levels of the rat's intestine, but none produced penicillinase.

DUODENAL INTUBATION

Since the results obtained with enteric-coated capsules appeared to show that absorption of penicillin from the gut became progressively worse the farther down the

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small intestine it was released, it seemed likely that the best absorptive area for penicillin, as for many other substances, was the upper end of the small gut. If this area was small, the length of time a solution of penicillin came in contact with it would be important. To test this assumption the following experiment was devised.

Five persons swallowed duodenal tubes on several occasions, and pairs of experiments were carried out on each: in the first a dose of penicillin was given through the tube in a small bulk (5 ml.) of water; and in the second, on a subsequent occasion, the same dose was given in a large bulk (250 ml.).

The object was to give the penicillin in such a bulk that on the first occasion it would tend to remain in the vicinity of the opening of the tube, whereas on the second occasion the increased amount of fluid would tend to pass rapidly along the gut. The only evidence accepted as proof of duodenal intubation was radiographical.

The larger volume of fluid was run in through a funnel by gravity, and the smaller was introduced with a syringe. Loss in the tube in the latter case was prevented by giving the penicillin in 2 ml. of water, washing through with a further 3 ml., and finally emptying the tube with 3 c.cm. of air, the volume of the tube.

Owing to individual variations in absorption each person was given by mouth test doses of penicillin in water on an empty stomach to select for use the smallest dose which would give blood-penicillin levels of the same order as those obtained from 15,000 units in a good absorber. In this way it was possible to average the different results, which are shown in fig. 4, where the results from penicillin by mouth are called control. The blood-penicillin levels obtained in each person in the various experiments are shown in table VI.

GLUCOSE

Since Armstrong et al. (1945) have shown that penicillin can be demonstrated in the blood for a longer time when injected intramuscularly in 5% glucose than when given in normal saline solution, we investigated the possibility that glucose might similarly affect penicillin given by mouth.

We carried out 73 experiments in 11 persons; 12 of these experiments were controls, the penicillin being swallowed in water instead of glucose solution. Only two doses of penicillin were used, 20,000 units and 100,000 units, and two glucose solutions, 5% (isotonic) and 20%.

Most of the experiments were carried out on an empty stomach, but in some persons a better result was obtained both in the control and in the glucose experiment when this was done two to three hours after taking food.

Ultimately, however, these experiments were abandoned because, though in some cases considerable improvement was shown, this was not a constant finding.

The beneficial effect was a longer maintenance of the blood-penicillin level as compared with the control, which was repeatable in the same subject but was not necessarily of any use in improving the blood-penicillin levels in a person known to be a poor absorber.

One example of the effect in a glucose-sensitive subject is shown in fig. 5.

TABLE VI—EFFECT OF FLUID VOLUME OF DOSE ON ABSORPTION OF PENICILLIN ADMINISTERED INTRADUODENALLY

Subject no.	Dose	Bulk (ml.)	Blood-penicillin levels (unit/ml.) at various times				
			20 min.	40 min.	1 hr.	2 hr.	3 hr.
1	15,000	5	0·13	0·5	0·75	0·11	0
	15,000	250	0·1	0·16	0·09	0	0
	15,000	Control	0·03	0·07	0·09	0·01	0
2	15,000	5	0	0·03	0·1	0·05	0
	15,000	250	0	0·03	0·04	0	0
	15,000	Control	0·01	0·06	0·04	0	0
13	15,000	5	0·06	0·25	0·2	0·03	0
	15,000	250	0·01	0·04	0·13	0·01	0
	15,000	Control	0	0·13	0·03	0	0
14	50,000	5	0·35	0·35	0·25	0·06	0·03
	50,000	250	0·35	0·2	0·13	0·06	0
	50,000	Control	0·06	0·04	0·03	0	0
24	50,000	5	0·09	0·09	0·04	..	0
	50,000	250	0·04	0·04	0·01	0	0
	50,000	Control	0·09	0·09	0·04	0	0
Mean	..	5	0·13	0·24	0·27	0·06	0
		250	0·1	0·09	0·08	0·01	0
		Control	0·05	0·08	0·05	0	0

DISCUSSION

In the absorption of drugs from the alimentary tract the buccal mucosa is the first possible portal of entry. The experiments in this connexion showed clearly that absorption through the buccal mucosa was of no importance.

In the stomach there are two factors for consideration: the effect of food, and the action of the gastric juice. Burke et al. (1945) briefly investigated the influence of food on the absorption of penicillin and found that administration two hours after a meal gave better blood-penicillin levels than half an hour after food. These workers in all their experiments recorded blood-penicillin levels greatly in excess of those recorded by any other workers—even greater than the levels usually obtained after an intramuscular injection of the dose they used.

From a therapeutic point of view it was essential to know the relationship of penicillin absorption to food more exactly. Table I shows that, of 12 persons fully tested, only 6 showed detectable blood-penicillin levels after the administration of 15,000 units in water by mouth. Of these 6, only 1 had a measurable blood-penicillin level when the penicillin was swallowed either with, or an hour after, food. At two hours after food 4 of these persons showed blood-penicillin levels, increasing to 5 persons at three hours. On an empty stomach—i.e., before breakfast in the morning or not less than four hours after a meal—with one exception (subject 11), all 6 subjects showed their maximal blood-penicillin level. Besides this group of 12, 4 other persons each swallowed the test dose on an empty stomach only: 2 of these gave satisfactory blood-penicillin levels, showing that 8 out of 16 persons had absorbed measurable quantities of penicillin after taking 15,000 units. It is interesting to compare this result with that in which all of 9 subjects gave detectable blood-penicillin levels after swallowing 20,000 units on an empty stomach. It seems, therefore, that blood-penicillin levels used as an index of absorption indicate that 15,000 units is about the median detectable dose.

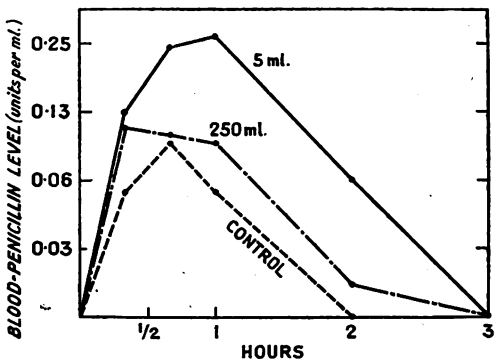

Fig. 4—Mean blood-penicillin levels of 5 persons detailed in table VI showing effect of fluid volume of dose on absorption of penicillin administered intraduodenally and of penicillin given by mouth as a control.

The absorption of penicillin having been shown to be maximal in the absence of food, the influence of the resting gastric juice was next investigated. Table II shows that the only destructive pH encountered in the alimentary canal is the acid one. Tables III and IV show that the pH must be less than 3 to produce any appreciable destruction of the penicillin in 40 min. This is important, because in 15 experiments in which penicillin was swallowed by 6 persons the peak blood-penicillin level occurred at or before this time in 13

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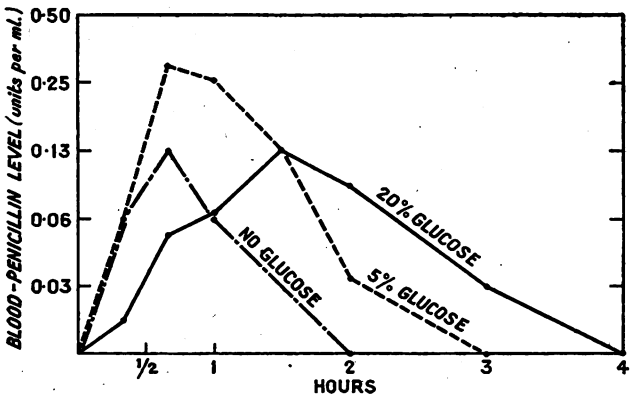

Fig. 5—Influence of glucose on absorption of penicillin in a good absorber.

instances, the remaining 2 being at one hour. Therefore, unless the pH of the gastric juice is less than 3, no significant destruction can be attributed to this factor by the time the peak of the blood-penicillin level is reached. Since the number of persons with a resting gastric pH of under 3 appears to be considerably less than the number of persons who absorb penicillin indifferently, it seems unlikely that destruction by acid gastric juice can be the only factor concerned. This supposition becomes even more tenable when it is realised that, during the first forty minutes after swallowing the penicillin, absorption is continually going on and thus the greater part of any dose cannot come in contact with the acid for anything approaching this length of time.

The question therefore remains whether the administration of alkali with penicillin is really advantageous. Finland et al. (1945) concluded that penicillin given in saline on an empty stomach gave blood-penicillin levels as good as those produced by any preparation incorporating antacids or buffers, with the possible exception of aluminium-hydroxide gel. This view is also in agreement with that of McDermott et al. (1945), who obtained blood-penicillin levels of the same order with penicillin in water, with or without antacid. György et al. (1945), however, found considerably higher blood-penicillin levels when sodium citrate was administered with the penicillin. From the results of our investigations it appears that an antacid would only be beneficial as such in preventing the gastric contents from being less than pH 3, which could only help in a limited number of cases. In this connexion, however, it should be remembered that slightly alkaline fluids traverse the stomach more readily than do acid or neutral fluids, and this fact is often utilised in dispensing irritant substances—e.g., digitalis and salicylates. The use of antacids or buffers, if given with penicillin, in a watery solution and not in capsules, may well help as much by facilitating the rapid entrance of the drug to the small intestine as by neutralising the gastric acidity.

Since absorption of penicillin is so rapid when it is given by mouth in water, a large proportion of the dose may well follow the lesser curvature of the stomach and mix little with its contents. If this explanation is correct, the choice of antacid becomes important. Those antacids which dissolve readily in water—e.g., sodium citrate and sodium bicarbonate—would be preferable for administration with penicillin in aqueous solution. The water-insoluble antacids—e.g., kaolin and magnesium trisilicate—adsorb the penicillin and tend to adhere to the gastric mucosa, which is obviously undesirable.

Capsules were often used in the early days; sometimes the penicillin was given by itself in this manner (Burke et al. 1945), and at other times it was incorporated in an oily base (McDermott et al. 1945). This method has now fallen into abeyance, partly because the capsules, enteric-coated to avoid the effects of gastric acidity, gave progressively worse blood-penicillin levels the farther down the gut they disintegrated (fig. 3), and partly because, even when they were not enteric-coated, with the result that they dissolved in 2–10 min., they still gave blood-penicillin levels no better than, and often inferior to, those given by penicillin in aqueous solution (table v).

The observation that blood-penicillin levels become progressively worse the farther down the intestine the drug is released is open to two possible explanations: there may be destruction by penicillinase; or the absorptive power of the intestinal mucosa may diminish progressively. As regards penicillinase, Wilson and Miles (1947) state that the bacterial flora of the normal gut consists of a few enterococci in the jejunum and increasing numbers of coliform and other organisms in the ileum. Our experiments showed that duodenal contents aspirated by tube in most cases contained no viable organisms, but such microbes as were cultured in no instance produced any penicillinase. Similarly in the jejunum no penicillinase-producers were found, and in the ileum 1 of 2 cases showed a coliform organism to be present which produced only 2 units/ml. of penicillinase in twenty-four hours under optimal conditions. It therefore seems most unlikely that penicillinase activity could play anything but a negligible part in the unsatisfactory results of giving penicillin by mouth.

The absorptive power of the intestinal mucosa was investigated in the experiments with duodenal intubation. The proximal part of the duodenum is well known to contain the optimal absorptive mucosal area for various substances. Experiments already discussed focused attention on this part of the gut; and, since the exact extent of this area is unknown, it was thought advisable to determine the influence that duration of contact between drug and mucosa in this area might have on the absorption of penicillin.

With doses that gave about the same blood-penicillin levels in different persons, experiments were carried out to determine the effect of giving the same dose of penicillin on two separate occasions to each person. The first time the dose was in a small bulk, 5 ml., and the second in a large bulk, 250 ml., of water. The idea was that the larger bulk would stimulate peristalsis and by gravity tend to leave the proximal part of the duodenum much more rapidly than would the small bulk; in which case the results should be better with the smaller bulk. This was found to be true (see fig. 4 and table vi). In subjects 1 and 13 the blood-penicillin levels obtained with the small bulk of fluid were comparable with those usually obtained with an intramuscular injection of the same dose.

Though only 5 persons were tested, the fact that the difference was of the same sign in each case is highly significant, even if the benefit from the cross-over test is ignored. Comparison of the small and large bulks, so far as maximal blood-penicillin levels were obtained, gave a mean of the difference of 0·16 unit/ml., with a standard error of ±0·09.

In a few cases penicillin was injected through the gut wall at operations for laparotomy or gastro-enterostomy. Since only one experiment could be done in each person, it was not thought to be a very practical way of obtaining evidence about the influence of bulk on the absorption of a given dose. However, in several cases very good blood-penicillin levels were obtained, suggesting that the condition of the patient and the anæsthetic had little inhibiting effect.

The possibility that any one type of penicillin might be better absorbed than another can be disregarded in the light of the experiments on selective absorption.

The use of glucose was disappointing. In several instances the blood-penicillin levels were higher and

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maintained longer; but glucose did not produce a consistent improvement in poor absorbers. Nevertheless, from a therapeutic point of view, some caloric intake is essential, and for a few days at the height of an illness carbohydrate as a food source is all that is required. It is fortunate that this can be provided in a manner which, far from interfering with the absorption of penicillin, may improve it.

McDermott et al. (1945) have stated that, to produce blood-penicillin levels comparable with those following an intramuscular dose of penicillin, five times as much must be given by mouth. This appears to be a generalisation but does not distinguish between the good absorber and the bad. In our series, both for 20,000 units and 100,000 units, this relationship, even supposing that the increase in blood-penicillin level was proportional to the increase in dose, held good only for the good absorbers, who from a treatment point of view present little difficulty in any case. Ten times the intramuscular dose, however, seems to be a safer figure to ensure satisfactory results in both poor and good absorbers.

If penicillin is to be given by mouth, the following system is suggested. The penicillin should be given in about 4 oz. of 5–10% glucose solution, containing about gr. 20 of sodium bicarbonate or citrate, before meals, and not less than three hours, preferably four hours, after the previous meal. The dose should be ten times as great as the dose of intramuscular penicillin that produces the blood-penicillin levels required. If these are to be maintained continuously, a dose of 500,000 units by mouth should be satisfactory.

SUMMARY

To ensure the best possible absorption, penicillin by mouth should be given on an empty stomach.

There is no evidence that any of types I, II, III, and K penicillin is better absorbed than another.

In all instances the use of capsules gave results inferior to those obtained with the same dose in aqueous solution.

The destructive effect of gastric acidity is only of importance when the pH is less than 3.

Most of the penicillin is absorbed in the upper part of the small intestine.

Destruction of penicillin by penicillinase in the upper digestive tract is negligible.

Glucose is a convenient source of energy which can be given with penicillin and often enhances the result.

The most important factor influencing the absorption of penicillin seems to be the unexplained individual variations in the absorptive capacity of the gut.

We wish to thank Sir Alexander Fleming for his stimulating interest and encouragement; Dr. D. Rowley for the extraction of penicillin from urine; Drs. K. E. Cooper, K. W. Cross, and A. H. James for helping us by swallowing duodenal tubes; many others for acting as experimental subjects; Prof. C. A. Pannett, Mr. A. E. Porritt, and Mr. J. C. Goligher for certain specimens; and the Sir Halley Stewart Trust for their continued financial support to one of us (H. C. S.)

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SPEECH AFTER REPAIR OF CLEFT PALATE

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THE importance of a cleft palate to the patient lies in its effect on speech, and the ultimate criterion of operative repair is the resultant speech. Operations such as the Langenbeck, designed only to close the obvious cleft, do not provide one of the factors essential for normal speech—a soft palate capable of reaching the posterior pharyngeal wall, so making possible complete oronasal closure. Passavant (1869) first described how this closure was brought about, the soft palate rising upwards and backwards to reach a prominent ridge on the posterior pharyngeal wall caused by contraction of the superior constrictor muscle (Passavant 1869, Whillis 1930); though more recently Townshend (1940) and Wood Jones (1940) have shown that the muscle-fibres concerned in this ridge are those of the palatopharyngeus.

Since Passavant described the sphincteric action at the hiatus nasopharyngeus there has been a gradual development in surgical practice towards an operation which does not merely close the cleft but also brings the soft palate nearer to the pharynx. Important stages in this development were the operations described by Gillies and Fry (1921) and Veau and Borel (1931).

Veau aimed at reducing scar tissue to a minimum by completely suturing the nasal mucosa as well as the buccal and by approximating the two halves of the soft-palate musculature. In addition to reconstructing the palate in layers, he completely freed from the bone the long flaps of hard-palate mucosa, so as to allow them to lie intimately against the bone in their new position. This also permitted the soft palate to be more readily displaced backwards into the pharynx. Of 100 children who underwent this operation 62 acquired normal speech; and of 47 of them operated on during the first two years of life 34 (72%) acquired normal speech (Veau and Borel-Maisonny 1933).

Wardill (1927, 1928, 1933, 1937) emphasised the importance of the palatopharyngeal sphincter, or valve, formed by the soft-palate muscles and those of the posterior pharyngeal wall. He drew attention to the continuous activity of the valve during speech, and demonstrated that, unless it was competent, production of normal speech sounds was impossible. He showed further that in cases of cleft palate the bony pharynx was abnormally wide and deep, making it more difficult to construct a competent valve. To overcome this anatomical handicap he introduced the operation of pharyngoplasty, in which a transverse incision was made across the posterior pharyngeal wall at the level of the arch of the atlas, exposing the muscle-fibres which here descend in a distinct bundle on either side of the midline. The wound was then sutured vertically, bringing together the two halves of the muscle, narrowing the pharynx from side to side, and producing a bulge of muscle in the region of the normal Passavant's ridge. An alternative method of narrowing the nasopharynx was described by Browne (1934).

The repair of the palate described by Wardill included the best features of the Gillies-Fry and Veau operations. Long flaps of mucoperiosteum were raised from the hard palate (in later operations four shorter flaps were used); the soft-palate muscles were completely freed anteriorly from their attachment to the posterior edge of the hard palate, and from the pharyngeal wall laterally. Fracture of the hamular process on each side freed the soft palate

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further and destroyed the action of the tensores palati. Having been taken to pieces in this way, the palate was sutured in layers, allowing the soft palate to take a new, more posterior, position. The method is an application of the V–Y principle of plastic surgery, the soft palate being lengthened and brought nearer to the posterior pharyngeal wall.

If the child can be given a normal palatal speech mechanism—i.e., a normally shaped palate and a competent palatopharyngeal valve—the best time to repair the palate is before the child learns to speak. Speech can then be learnt by the ordinary imitative habits of childhood, and the bad habits and tricks of cleft-palate speech will not have to be unlearnt.

The results of this operation have been summarised by Wardill as follows:

"It can be said that where the operation is done during infancy, and *where a functional palatopharyngeal valve has been formed*, speech will develop along normal lines without any training" (Wardill 1933).

"Children operated upon by this method before the age of speech, assuming a successful surgical result, grow up in the large majority of cases as normal children, without any of the stigmata of cleft palate; and they require no speech training beyond what is customarily given to any normal child" (Wardill 1937).

We here describe the speech results in a consecutive series of 100 children whose cleft palates were repaired by one of us (F. H. B.), following the technique described by Wardill. The assessment was made primarily to learn our own results; but they may also be of use to practitioners and surgeons who have to advise on the treatment of these difficult cases. As Morley (1945) wrote:

"Very few surgeons, even up to the present day, have published detailed accounts of the speech results of their operative procedures."

METHOD OF TREATMENT

The children were operated on in the Duchess of York Hospital for Babies, Manchester. A hospital such as this, with doctors and nurses experienced in nutritional disorders and the care of infants, is essential to the success of a cleft-palate centre. Skilled pædiatric care before and after operation makes possible a high standard of safety. It is a testimony to the care of our medical colleagues and the nurses, largely under the guidance of Dr. Catherine Chisholm and Dr. Sylvia Guthrie, that in 100 children coming to hospital for repair of the palate operation was never refused and no child died.

Age at Operation.—If the case was one of complete cleft, the lip and anterior palate were repaired by Veau's (1931) technique when the infant was 3 months old. The main palate operation was done at the age of 12–21 months.

Anæsthetic.—The anæsthetic consisted of intratracheal nitrous oxide, oxygen, and ether, given by Dr. K. B. Pinson, whose watchful care and great experience were in large part responsible for the good condition in which the infants left the operating-theatre.

Operation.—The technique followed that described by Wardill, except in two particulars:

(1) Instead of four short flaps of hard palate mucosa, one long flap of mucoperiosteum was raised on each side—as in the Veau and earlier Wardill operations—and the posterior palatine arteries were preserved. Careful freeing of the tissues round these vessels allowed them considerable mobility.

(2) Pharyngoplasty was performed in the first half of the series only; in the second 50 cases the posterior pharyngeal wall was not disturbed.

At the end of the operation it was seen that the anterior ends of the hard-palate flaps were now 0·75–1·0 cm. further back in the mouth than when they were first raised, a measure of the posterior displacement of the new soft palate. As the anæsthetic tube was withdrawn and the child gagged, it was seen that the soft palate could reach the posterior pharyngeal wall.

Assessment.—The children were examined 4–8 years after the operation, at the age of 5–9 years. Speech therapy had not been used. Each child had learnt to speak at home in the ordinary way. It was possible to determine whether the palatopharyngeal valve was competent by the absence of nasal escape or of nasal intonation during speech, by the child's ability to snort or to blow up a balloon, and by his ability to pronounce correctly the explosives K and G. It is well known, however, that a child may be able at the doctor's knee to demonstrate complete oronasal closure in any of these ways, and yet at home exhibit all the faults of cleft-palate speech. In this series some of the children whose speech was assessed as "imperfect" could say all the test words correctly and could blow up a balloon, but had obvious faults in continuous speech. For this reason, after investigating the condition of the palato-pharyngeal valve, we took as our criterion in assessing the result the quality of speech when the child was talking with his parents or friends.

TABLE I—SPEECH RESULTS AFTER OPERATION FOR CLEFT PALATE

Type of cleft	Total	Speech perfect	Speech perfect except for minor hard-palate or lip faults	Speech imperfect	Imbecile
Postalveolar	41	27	8	4	2
Complete ..	49	19	18	11	1
Total ..	90	46	26	15	3

RESULTS

There was no death in hospital in this consecutive series of 100 children.

The soft palate remained totally united in all cases. In 12 cases a small perforation (up to 0·5 cm. in diameter) developed between the mouth and the nose at the tip of the hard-palate flaps.

Of the 100 children, 90 were examined; 6 of the missing children had died from accident, enemy action, or disease; 4 children could not be traced.

In 41 of the 90 children the cleft was postalveolar—i.e., of the soft palate, or of the soft palate and hard palate only, the alveolus being intact. In the remaining 49 the cleft was complete—i.e., of upper lip, alveolus, and palate, whether unilateral or bilateral.

Of the 90 children, about half (46) spoke perfectly, with no speech stigma of any kind; about a quarter (26) spoke perfectly except for small faults associated with irregularity of the anterior hard palate or lip; and about a fifth (18) spoke imperfectly (in 3 of these the operation could not be assessed, because the children were mentally defective). The results are shown in table I.

Speech Perfect

In the 46 children who spoke without stigma, tests for oronasal closure showed the palatopharyngeal valve to be competent.

A child was placed in this category only after a most critical examination. The description "perfect" meant that the speech was in every way indistinguishable from that of a normal child.

This speech result was obtained more often after repair of a postalveolar cleft than after repair of a complete cleft (table I), since with a complete cleft the alveolus is more likely to be deformed or the lip adherent, leading to difficulties in sound-production (see below).

It was notable in these children that the soft palate was long, mobile, and supple; and that the hard palate was smooth and regular in contour, with the teeth in

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good position. The operation had produced normal anatomical structure of soft and hard palate; the consequence was normal speech.

Speech Perfect except for Small Faults

In all these 26 children the palatopharyngeal valve was competent and the consonants G and K were spoken perfectly. There was no nasal escape or nasal intonation in their speech. There were, however, minor faults associated with deformity of the anterior palate or of the lip.

Anterior palate faults were found in 20 of the children, who had small imperfections in the sounds which are modified in the anterior palate and alveolar region, such as S, T, TH, D. The effect was to produce a slight lisp. The fault had an anatomical basis. Behind the incisor teeth the anterior hard palate was irregular, and the arch of the palate was unduly high owing to the repaired palate having fallen in a little towards the nasal cavity. An actual perforation at this site was found in only 4 instances.

In other cases the alveolar curve was triangular rather than rounded, or the alveolar ridge was irregular in contour, owing to malposition of the premaxilla. As a result of this unevenness the teeth were irregularly placed, sometimes very much so. These anatomical faults were naturally more common in cases of complete cleft (table I).

The operation had provided a competent palatopharyngeal valve, and the speech result of the soft-palate repair was excellent. The deformity of the anterior palate remained, however, as a cause of slight imperfection. It is difficult to see how the anterior palate and alveolar region could be repaired differently. The method aims at separate and complete nasal and buccal closure in this region, but the absence of bony palatal processes in the line of cleft leaves a tendency for the repaired mucosa to fall in towards the nasal cavity. If the cleft is wide, the two halves of the hard palate will tend to fall together, with consequent malposition of the alveolar regions. Irregularity of dentition follows.

If operative ingenuity cannot solve this problem, much might be done by orthodontic treatment. Prof. F. W. Wilkinson, director of the Dental Hospital, University of Manchester, who joined in the review of this series of cases, was emphatic that orthodontic measures could largely prevent this secondary deformity and cause the anterior palate and alveolar ridge to take up a correct position during the important early years of life.

If it is agreed, therefore, that a high level of achievement in cleft-palate surgery depends first on pædiatric skill, it should be added that final success requires the coöperation of the orthodontist. In the light of this experience we urge that, in the postoperative care of children with cleft palate, the orthodontic department should take a full share in the routine follow-up, so that any avoidable deformity can be prevented, and blemishes in speech reduced to a minimum.

Lip faults were found in 6 children, who had some difficulty in producing a normal F, V, M, P, or B. These were all cases of complete cleft, with tightness of the upper lip and adhesion of the lip to the alveolus. The deformity was greatest where the cleft had been wide and the lip elements small. The only surgical remedy seems to be to repair the lip afresh as the child approaches adolescence, when the soft tissues will be larger and more supple.

It is true that in both these types of minor defect speech therapy could correct the faults, even in the presence of anatomical deformity. If, in the search for a perfect repair, the surgeon appears to deny the presence of his ally, the speech therapist, it is only because of his insistence that normal function depends on normal structure. Wardill has said: "It should be the aim of every surgeon who is dealing with these cases to put the speech trainer out of work." Owing to the very nature of the problem, however, there must remain a residuum of cases in which the surgeon's aim is not achieved, and where only the labours of the speech therapist can cause the child to speak perfectly.

Speech Imperfect

In 18 children there were more serious speech faults, due to various causes: gross deformity of the jaws, incompetent palatopharyngeal valve, defective speech sense, nervousness and stammering, and imbecility.

(1) *Gross deformity of the jaws* was found in 6 children, all cases of complete cleft, with considerable underdevelopment of the maxillæ and imperfect alveolar ridges and dentition; associated with this deformity was "overbite" of the lower jaw, causing severe malocclusion. The soft palate in these cases was long and mobile, and the palatopharyngeal valve was competent. The explosive sounds were excellent, but there were gross faults in all other sounds, with lateral air escape.

These faults in speech were not related to the cleft of the palate or to its repair, but to the grossly abnormal condition of the jaws. Such deformities and speech troubles occur in children whose palates are intact, though they are to be expected more often in the congenital maldevelopment that leads to a cleft palate.

TABLE II—SPEECH RESULTS WITH AND WITHOUT PHARYNGOPLASTY

	No. of cases	Perfect speech or minor hard-palate or lip faults	Imperfect speech	Incompetent palato-pharyngeal valve
With pharyngoplasty	41	36	5	0
Without ,,	46	36	10	2
Total ..	87	72	15	2

The palatopharyngeal valve was competent in all these cases, and therefore it could be expected that by a combination of orthodontic treatment and speech therapy normal speech would be possible.

(2) *Incompetent palatopharyngeal valves* were found in 2 children, whose soft palate at operation was very small and, in spite of extensive freeing of the soft tissues, could not be approximated to the posterior pharyngeal wall. The operation note in these two cases forecast a poor speech result, and such was the outcome. The palatopharyngeal valve was incompetent; consequently there was nasal escape during speech, and the various tricks of cleft-palate speech were present. Operation had failed in its aim because of insufficient material with which to make the anterior part of the palatopharyngeal valve. Such a shortage of palate tissue occurred only twice in 100 operations, a sufficiently rare occurrence to justify the routine operative procedure.

(3) *Defective speech sense* was found in 5 children, aged 6–9, in whom the palatopharyngeal valve was competent and the explosive sounds were good, but formation of words was lacking. By their habits, manner, and appearance the children did not seem to be mentally backward, and from the condition of the palate normal speech would be expected; but coördinated speech was completely lacking, and though the children could repeat all test sounds correctly they appeared to be lost when asked to repeat words.

The aim of the operation—complete oronasal closure—had been achieved in these children. Normal speech would only be possible, however, if the defective speech sense could be made good.

(4) *Nervousness and stammering* were found in 2 children. In both of them complete oronasal closure

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was possible and the explosive sounds were good. The result of operation was satisfactory, but speech remained defective, as in the previous group, because of a disability of the central nervous system.

(5) *Imbecility* was found in 3 children in whom the structure of the palate appeared satisfactory, but it was impossible to carry out any tests.

We do not know whether this high incidence of mental deficiency is to be expected in any collection of children with cleft palates. Apart from these 3 children, mental backwardness was not conspicuous in our series. On the contrary, a feature of the children who spoke perfectly or almost so (three-quarters of the total) was their mental alertness and general brightness—conditions no less obvious in their enthusiastic parents, who came gladly to the follow-up clinics year after year, in many cases travelling long distances. There can be no branch of surgery more satisfying to the surgeon than cleft-palate reconstruction, which demonstrates the fascinating physiological result that follows a successful technique, and sees such gladness in parent and child.

PHARYNGOPLASTY

It is of interest to compare the function of the palato-pharyngeal valve and the speech results in the series in which pharyngoplasty was performed with that in which it was not. The results obtained in 87 children in whom it was possible to assess the speech mechanism are given in table II.

The figures do not show much difference between the two groups. The aim of a pharyngoplasty is to facilitate closure of the palatopharyngeal sphincter. In all the cases in which pharyngoplasty was performed this closure was gained; and, though there were 5 imperfect speakers in the group, the cause of the imperfection was not in the palatopharyngeal valve. In the comparable group in which pharyngoplasty was not performed there were 10 imperfect speakers, and in 2 of these the palato-pharyngeal valve was at fault. These were the 2 cases (described above) in which the soft palate was noted as being very small and posterior displacement at operation was inadequate. Possibly, if the pharynx had been narrowed by a plastic operation, the small soft palate might have become adequate to effect oronasal closure.

There was thus this small difference in our results in favour of pharyngoplasty. Examination of the pharynx in children in whom pharyngoplasty had been done showed a rather fixed and immobile posterior pharyngeal wall. By contrast, in the cases in which pharyngoplasty had not been done the posterior pharyngeal wall was mobile, with good contraction and elevation of its muscles. It was our impression that after pharyngoplasty the advantage gained by the narrowing was lost by the immobility that followed; whereas when the posterior pharyngeal wall was not disturbed it developed a mobility that compensated for the slightly greater diameter of the pharynx.

CONCLUSION

Wardill's operation aims to close the anatomical defect and to construct a competent palatopharyngeal valve on which speech depends. Wardill claimed that, if a normal palatal speech mechanism was provided at an early age, the child would speak normally without speech training.

In our results these claims are justified, for in only 2 children was the palatopharyngeal valve incompetent. Without speech training, perfect speech was obtained in about half the cases, and in another quarter there was perfect speech marred only by slight articulatory defect due to irregularity of the anterior hard palate

The remaining cases (about a fifth of the total) showed various additional hazards such as gross deformity of the jaws, and defective speech sense—conditions not remedial by operation alone.

SUMMARY

A modified Wardill's operation was performed in 100 consecutive cases of cleft palate in children aged 12–21 months.

At follow-up examination about half the children had perfect speech; about a quarter had perfect speech except for minor faults due to irregularity of the anterior hard palate and alveolus; and about a fifth had imperfect speech, though only 2 had an incompetent palato-pharyngeal valve.

Pharyngoplasty did not seem to produce better results.

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TRILENE ANALGESIA

SIMPLE APPARATUS FOR SELF-ADMINISTRATION

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DURING the late war there was a great demand for a rapid and safe analgesic capable of use with no more than printed instructions. Early experience with assault landing troops showed that a satisfactory, though short, analgesia could be induced with a wool plug soaked in 'Trilene' in an ordinary 'Benzedrine' nasal inhaler. From these observations the present instrument was gradually evolved for the use of commandos, air, naval, and tank crews, and ambulance personnel, as well as to meet most of the normal medical requirements of trilene analgesia.*

Description of this instrument has been deliberately withheld for two years while it has undergone extensive trials both in Great Britain and in South Africa. The results have been so favourable that publication now seems justified.

DESCRIPTION

The inhaler (figs. 1 and 2) is of metal, $8^1/_4$ in. long and $^7/_8$ in. in diameter, and weighs 10 oz. when fully loaded. It is designed on the principle of a cigarette lighter with an absorbent cotton-wool pad and a capillary wick leading trilene from a 6 ml. ampoule into a vaporising chamber seated in a nasal nozzle. This volume of trilene is just enough to saturate the pad without producing any fluid excess, and though sufficient for analgesia lasting 60–90 min. is insufficient to produce anæsthesia. The inhaler is brought into use by breaking the base of the ampoule with a spring plunger.

The component parts of the inhaler consist of (1) a plated brass tube with an internal screw thread at either end; (2) a plated brass cap at one end; (3) a plug at the other end fitted with a projecting spring plunger to prevent leakage of trilene; (4) a spring coiled round the plunger and the neck of the ampoule to hold it in place; and (5) the vaporiser unit, which screws into the cap end of the inhaler and bears a hollow nasal nozzle tapered to fit any nostril. The nozzle can be unscrewed for cleaning and sterilisation. The other

* Though the original work was done in England, experience showed that modifications in design were desirable, and the final instrument described here was manufactured by J. G. Dalton (Pty.) Ltd., Johannesburg, who now market it under the name 'Trilite inhaler.' Imperial Chemical (Pharmaceuticals) Ltd., Manchester, also played a large part in its development by providing the accurate ampoule charges of trilene on which the instrument depends.

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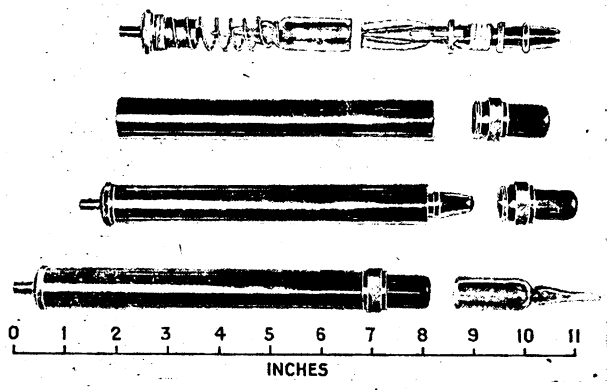

Fig. 1—Components of inhaler.

end of the vaporiser unit is tapered to pierce the base of the ampoule when necessary.

METHOD OF USE

The inhaler is loaded by unscrewing the plug, inserting a standard trilene ampoule, base foremost, and replacing the plug. The inhaler is now ready for immediate use, but it may be stored indefinitely without deterioration.

For use, the spring plunger is sharply struck against any rigid object, thus breaking the base of the ampoule against the tapered end of the vaporising unit. The inhaler is then held with the nozzle downwards for 5–10 sec., whereby the whole charge is absorbed and the wick draws trilene into the vaporising chamber. The cap is then removed, and the patient told to place the nozzle in one nostril, close the other nostril by finger pressure (fig. 3), and breathe normally in through the nozzle and out through the mouth. If the patient breathes out through the nozzle the direction of airflow is reversed and trilene wastefully blown out of the inhaler. Alternatively the nozzle may be inserted into the mouth. The patient is told to breathe normally until the pain disappears. Full analgesia is usually established with some twenty inhalations (about a minute). When analgesia has been induced, use of the inhaler is discontinued until pain begins to return, whereupon a further four or five inhalations of trilene reinduce analgesia.

A single ampoule is usually enough to maintain analgesia for 60–90 min. The patient, who is conscious throughout, is told to report any indication that the charge of trilene is becoming exhausted. The charge can be renewed in a few seconds by unscrewing the plug, removing the empty ampoule, tapping the inhaler gently to remove the broken glass fragments, and inserting a fresh ampoule.

When analgesia is required, the patient is told to breathe until a slight tinnitus or other subjective sign of analgesia develops. A further five or six breaths will then produce full analgesia, which can be maintained either by easy continuous or intermittent inhalation. If the inhaler is used for only a short time the cap should be replaced, and the inhaler can then be used again; but it is safer to leave the inhaler charged with an unbroken ampoule. One is then always certain that the instrument is ready for instant use however long it has been put aside.

The patient's subjective and objective reactions and the type of analgesia produced with this inhaler differ in no way from those produced with other apparatus (Scher 1946).

ANALGESIA PRODUCED BY THE INHALER

Type of case	No. of cases	Analgesia					
		Good	%	Fair	%	None	%
Surgical, excluding whitlows	532	454	(85·4)	49	(9·2)	29	(5·4)
,, whitlows	26	12	(46·2)	8	(30·8)	6	(23·0)
Medical	38	33	(86·9)	4	(10·5)	1	(2·6)
Gynæcological (operative)..	65	50	(76·9)	9	(13·8)	6	(9·3)
Labour (normal and forceps)	116	100	(86·2)	11	(9·5)	5	(4·3)
Obstetric (other procedures)	105	97	(92·4)	4	(3·8)	4	(3·8)
First-aid	301	256	(85·1)	22	(7·3)	23	(7·6)
Total ..	1183	1002	(84·8)	107	(9·0)	74	(6·2)

RESULTS

This inhaler has been tested by a number of my colleagues in various hospitals in South Africa and Great Britain. Detailed reports have been received on 1183 cases in which the inhaler was used for 67 different painful conditions (see table). Of these, analgesia was assessed as "good" in 1002 cases (85%), "fair" in 107 (9%), and "none" in 74 cases (6%). That is, analgesia was established in 94% of cases and failed to develop in 6%. The failures were mainly in Bantu patients whose coöperation is not easily obtained.

It has already been shown that trilene analgesia is not effective with the most severe degrees of pain. This is strikingly illustrated by the incidence of failures during the incision of whitlows (23%) compared with the 5·4% of failures in all other surgical procedures. The inhaler was used satisfactorily by unskilled personnel as a first-aid measure in 301 cases of burns, fractures, sprains, and abdominal, lacerated, and crushing wounds. In hospitals, one of its main uses is in the wards and the outpatients' department when painful dressings are being done. In the 300 cases of this kind reported the failure incidence was very low (3·7%).

Reports on the use of the inhaler in midwifery fell into two groups. There was first the series of 221 cases in the table, made up of 98 cases of normal labour, 18 of forceps delivery, and 105 of other obstetric procedures, which included 18 episiotomies, 15 manual removals of the placenta, 25 perineal repairs, 37 ruptures of membranes, 4 rotations or versions, 3 cases of prolapsed limbs, &c., 1 craniotomy, and 2 cases of eclampsia. It is notable that though in the whole series there were 24 cases in which analgesia was only fair or poor, only 4 of these failures occurred in the 105 "other procedures."

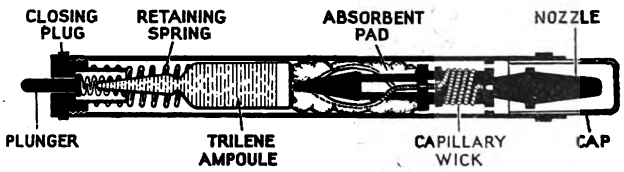

Fig. 2—Sectional details.

The second series comprised 450 cases, 300 coming from a busy private practice and 150 from a native and Indian hospital where it was not possible to keep as detailed records as in the first series. The results were assessed as follows:

European:	Analgesia excellent	75%	} 90%	
	,, satisfactory	15%		
	,, poor or none ..	10%		
Native:	Analgesia excellent	66%	} 81%	
	,, satisfactory ..	15%		
	,, poor or none ..	19%		

These results closely resemble those in the smaller series.

DISCUSSION

The efficiency of this inhaler is of the same order as the other machines available for self-administration of

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trilene. Scher's (1946) figures for his 521 cases are 84% good, 7% fair, and 9% none. Barratt and Platts (1946) obtained successful results in 85% of their cases, but also noted a high failure-rate in opening whitlows; their success-rate in midwifery was 86·5%. Hill (1944) induced satisfactory analgesia in 87% of his 62 patients, while Ellingham (1944), using Hill's machine for dentistry, was rather more successful with 5 failures in 100 cases.

It appears, then, that whichever machine is used, in every 100 cases trilene can be expected to produce a completely successful analgesia, often with amnesia, in 85 cases, partially to alleviate the pain in a further 9 or 10, and to fail completely in the remaining 5 or 6 cases.

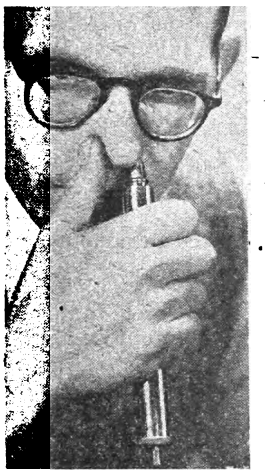

Fig. 3—Inhaler in use.

The inhaler described here does possess some advantages over the other machines, apart from the results obtained.

Its small size ($8^1/_4 \times 7/_8$ in.) and lightness (weight when fully loaded 10 oz.) allow it to be easily carried in the pocket, in a corner of one's bag, or in a first-aid kit. In contrast to other machines, it is virtually unbreakable. When fully charged, the spring holds the ampoule rigidly in place, and this can only be broken by striking the plunger firmly. Provided this is not done, the charged inhaler will withstand any amount of rough handling.

Once the inhaler is charged with an ampoule it is always ready for use, and provided that the ampoule is unbroken the inhaler may be left unused indefinitely but is ready when required. This is of particular importance when it forms part of a first-aid kit. If the inhaler is used only rarely a new charge should always be inserted after use. If it is used frequently this is not so necessary provided one remembers that the life of a single charge is 60–90 minutes of active use. The cap should always be replaced after use, and if this is done a partially expended charge will remain soaked in the absorbent pad.

The inhaler is used in a similar way to the familiar nasal inhalers, and, if the patient is told this, it will be correctly used at once. It can be issued as part of a first-aid kit in mines, ambulances, factories, &c., with the simplest of printed instructions. Anæsthesia cannot, of course, be self-induced with the inhaler.

The 6 ml. ampoule of trilene has itself several advantages over the larger bottle from which other machines are filled. It prevents waste, provides a constant charge which will produce analgesia for a known period, prevents loss by evaporation, and obviates any risk of deterioration. The ampoule is robust; when in the inhaler it has been flown at a height of 10,000 ft. and tested in the laboratory at a pressure equivalent to a height of 27,000 ft. without damage.

SUMMARY

A simple, compact, unbreakable instrument is described for the self-administration of trilene. It is designed to induce analgesia only and to be operated on the simplest printed instructions. It cannot self-induce anæsthesia and is therefore suitable for use by unskilled personnel in mines, ambulances, factories, and first-aid parties in general. It is equally suitable for use in planned minor surgery, dentistry, midwifery, &c.

It has been tested by 37 of my colleagues in 1183 cases comprising 67 different painful conditions. Analgesia was "good" in 85% of cases, "fair" in 9%, and in 6% failed to develop at all. This efficiency is equal to that attained with larger and more complex machines.

I am indebted to Dr. C. Langton Hewer, senior anæsthetist to St. Bartholomew's Hospital, London, and to Imperial Chemical (Pharmaceuticals) Ltd. for much helpful advice in the early stages of the development of this instrument; to my many colleagues who have been responsible for its clinical trials; to Mr. C. Whysall for the photographs; and to Dr. J. C. Thomas, senior pathologist, Natal Provincial Administration, for help in preparing this paper.

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HOLT'S DIPHTHERIA TOXOID (P.T.A.P.)

Al PO_4 CONTENT, PURITY, AGEING, AND DURABILITY OF IMMUNITY

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M.D. Lond.

With a note by L. B. HOLT, M.SC.

PRELIMINARY investigations showing the importance of using enough aluminium phosphate in the preparation of Holt's purified toxoid, aluminium-phosphate precipitated (P.T.A.P.), were reported previously,[1] when it was indicated that other work on the same lines would be undertaken.

Two further sets of P.T.A.P. samples, with different mineral carrier contents, prepared by Mr. L. B. Holt, were investigated under the same conditions as previously described—i.e., on Schick-positive children aged 1 year, partly in the same localities. In all cases single intramuscular injections of 0·5 ml. of P.T.A.P. were given, the Lf dosage of toxoid being kept constant at 5 units. The only variable factor in the different bottles was the concentration of aluminium phosphate. The effects of these single injections were studied by means of post-Schick tests 28 days later.

The first set of samples in this new series of observations were prepared from a relatively impure toxoid, batch E.2875, containing 10 Lf units per ml. and Al PO_4 in amounts of 3, 5, 7, 9, 11, 13, and 15 mg. per ml. The work was started when the samples were freshly prepared, but there were three bottles of each Al PO_4 concentration, a fact which will later be shown to have yielded some useful information.

TABLE I—SCHICK-CONVERSION RATES YIELDED IN 586 CHILDREN AGED 1 YEAR BY RELATIVELY IMPURE TOXOID, BATCH E.2875. DOSE 0·5 ML. CONTAINING 5 LF UNITS OF TOXOID (60% PURE IN TERMS OF PROTEIN)

Sample	Dose of Al PO_4 (mg.)	Post-Schick results		Conversion-rate (%)
		Positive	Negative	
H3	1·5	10	69	87·3
H5	2·5	4	79	95·2
H7	3·5	6	76	92·7
H9	4·5	5	80	94·1
H11	5·5	6	79	92·9
H13	6·5	3	81	96·4
H15	7·5	2	86	97·7

The results obtained from using all three bottles of each Al PO_4 concentration are given in table I. It appears that the differences in the amounts of Al PO_4 in the seven samples were too small to produce a clear-cut curve, but the results given by the extremes H3

1. Bousfield, G. *Lancet*, 1947, i, 286.

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and H15 seem to indicate the advantage of using an adequate amount of Al PO_4.

When these results are compared with curves constructed from work previously reported (see figure), the differences are seen to be not nearly so striking in the recent work. This may be due to the fact that the samples of P.T.A.P. used in the original work were slightly more purified than in the series quoted in table I. It is more likely, however, that the phenomenon is due to the fact that, in the more recent work, some of the subjects were London infants, who may have had a trace of basal immunity.

TABLE II—EFFECT OF AGEING ON P.T.A.P.

Sample	Dose of Al PO_4 (mg.)	Failure to convert to Schick-negative (%)	
		Bottle 1	Bottles 2 and 3
H3	1·5	14·0	10·5
H5	2·5	9·0	0·0
H7	3·5	10·0	5·6
H9	4·5	10·6	0·0
H11	5·5	11·0	2·7
H13	6·5	2·3	5·0
H15	7·5	2·2	2·2
Average for all samples ..		8·4	3·7

In the course of obtaining the results shown in table I, when I came to test children treated with the second and third bottles of each Al PO_4 concentration, it seemed that results were improving. There did not appear to have been any local changes in the prevalence of diphtheria infection to afford a degree of basal immunity to children treated with the second and third bottles. Accordingly the findings after the use of the first bottles of each Al PO_4 strength were analysed and compared with the joint findings after the use of the second and third bottles. All samples had been stored at room temperature, not in a refrigerator; this procedure was adopted deliberately, and the results (table II) appear to be significant, for bottles 2 and 3 had been subjected to several weeks of ageing under conditions which were anything but those supposed to be ideal.

Apart from group H13 (in which one or two refractory cases were possibly encountered in the use of bottles 2 and 3), there seems to be considerable evidence that better results are obtainable from samples of P.T.A.P. which have been stored for some weeks before use; and that the prophylactic improves even when stored at room temperatures. The fact also seems to emerge that if it is desired to use freshly prepared P.T.A.P. (see table II, bottle 1), the choice of Al PO_4 concentration should be about 13–15 mg. per ml. Larger amounts of mineral carrier than this cannot conveniently be used, though there is no reason to suppose that they would lead to excessive local reactions. Complaints of such reactions after intramuscular injection of P.T.A.P. have been entirely lacking, even with samples H13 and H15. No sterile abscess has been encountered, and one is forced to the view that the severe reactions which follow the injection of some batches of alum-precipitated toxoid (A.P.T.) are due to impurities brought down in the process of aluminium hydroxide precipitation.

The next investigation was made on batch E.3028, a toxoid of great purity. It was no less than 93% pure in terms of protein. This batch was also used shortly after preparation and no special precautions were taken about storage, as it was desired to find out whether the antigen retained its properties in spite of relative maltreatment. The results (table III) provide the answer to that point.

Each ml. of the samples contained 10 Lf units of toxoid plus amounts of Al PO_4 of 3, 5, 7, 10, and 15 mg. in the various preparations. The technique used was identical with that used in the children cited in table I. The figures obtained are surprisingly good in comparison with those of my original investigations (see figure, A). The excellent performance of this very pure batch as compared with series A (see figure) may be due to the fact that here again some of the subjects were London children. Although all of them were originally Schick-positive, some may have had traces of basal immunity. Considering the figure as a whole, it will be noted that the critical part of the curves tends to be during the phase when the smaller amounts of Al PO_4 are injected. When 5 mg. or more is injected, there is very little variance between the three curves. I regard this as an indication for the usage of adequate Al PO_4 in all preparations of P.T.A.P.

The results shown in table III are plotted as the curve C in the accompanying figure, and it will be noted that both curves B and C show a slightly better conversion-rate when the mineral carrier is injected in amounts of 7·5 mg.

It may well be asked: "Why all this fuss to try to obtain a few extra Schick-negative children in every hundred as a result of a single injection of prophylactic?" The answer is that the few cases per cent. which do not become Schick-negative easily include the children who are probably at the greatest risk if not properly immunised. It is child's play to protect about 90% of children; but it is the last 10% or so of relatively refractory subjects for whose sake it is necessary to develop the very best prophylactics that we can discover. In some people the mechanism of antitoxin production seems to be inferior or sluggish, and any immunity which they do develop appears to be relatively short-lived. I have observed this repeatedly in the course of much long-range post-Schick testing.

The paramount importance of an efficient primary stimulus is too well recognised to need discussion here; but it does follow that the more powerful and effective the primary stimulus the better will be the chance of a permanent basal immunity being produced by a second inoculation. Thus, by using the very best prophylactics, the odd 10% of difficult cases may be brought safely under the protection of the immunological umbrella.

TABLE III—SCHICK-CONVERSION RATES YIELDED IN 413 CHILDREN AGED 1 YEAR BY A PURE TOXOID (93% PURE IN TERMS OF PROTEIN)

Sample	Dose of Al PO_4 (mg.)	Post-Schick results		Conversion-rate (%)
		Positive	Negative	
K3	1·5	8	75	90·0
K5	2·5	7	80	92·0
K7	3·5	6	74	92·5
K10	5·0	7	79	91·9
K15	7·5	3	74	96·1

Many observations have been made on the results of using two injections of A.P.T. from various sources; but it is often overlooked that only a really shockingly bad sample will not produce a conversion-rate of about 95% as a result of two well-spaced injections. Samples not reaching this standard would be found to put up a truly woeful performance when the effect of a single injection was studied a month later, and the primary stimulus afforded must be poor indeed.

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DURABILITY OF IMMUNITY PRODUCED BY P.T.A.P.

In the early stages of investigating the optimal Al PO_4 content of P.T.A.P., Schick-positive children aged 1 year were inoculated with a dose of the prophylactic containing only 3 Lf units in 0·3 ml. A similar 3 Lf dose was given a month later, and a post-Schick test was performed simultaneously. The amounts of Al PO_4 present in these 0·3 ml. doses varied from 0·15 to 1·2 mg. By making the post-Schick tests at the same time as the second injections were given the long-range study of these cases is not upset by any additional stimulus such as would have been provided by a Schick test performed, say, 3 months after the second injection.

Of these cases, 57, which were all found to be negative as a result of a single 3 Lf dose a month after the injection but received a second 3 Lf dose at the same time as the post-Schick test, have presented themselves for long-range Schick tests two years after the original treatment. With one exception they gave a negative result.

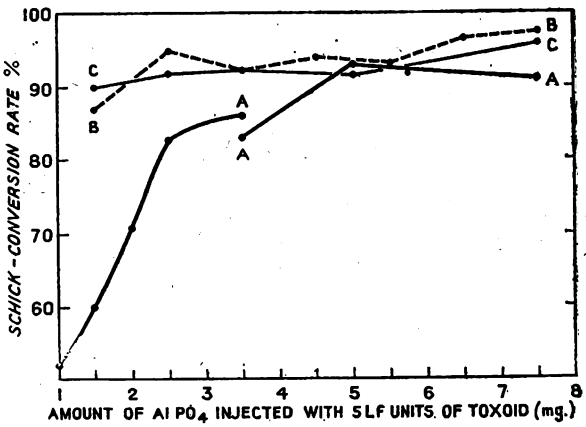
Further it has been possible to study a few cases which were Schick-positive a month after the first 3 Lf injection but had received another 3 Lf dose at the time this test was performed. These cases were all retested and found negative three months later. Of these children 47 had long-range tests two years later: 41 were Schick-negative still, and 6 had reverted to positive. All but one of the positive results in the long-range tests were in children who had been given P.T.A.P. with only smaller amounts of Al PO_4, which we now know to be inadequate for a really good prophylactic. Children given P.T.A.P. with the larger amounts of Al PO_4 have, with a single exception, maintained their immunity two years later after two 3 Lf doses of the prophylactic at a month's interval. These results can only be regarded as astoundingly good, even though the cases available for study are few; to realise just how efficient the antigen was, it is necessary to appreciate that these children received only the equivalent of 0·12 ml. of ordinary A.P.T. split into two doses. Including those inoculated with the less satisfactory prophylactic the 104 cases only show a relapse of 6·7% in two years despite the minute Lf dosage of the material used for inoculation.

TABLE IV—COMPARISON OF ORIGINAL SCHICK-CONVERSION RATES WITH PERMANENCE OF THE SCHICK-NEGATIVE STATE

Sample	Amount of Al PO_4 given in 0·3 ml. containing 3 Lf units of toxoid (mg.)	% of cases Schick-negative initially a month after 0·3 ml. dose	% remaining Schick-negative 2 yr. after 2nd 0·3 ml. dose
A	0·15	11	86·7
B	0·30	12	88·9
C	0·60	30	90·5
D	0·90	72	96·3
E	1·20	67	100·0

Relationship between Durability of Immunity and Original Schick-conversion Rate.—In the work just described five different concentrations of Al PO_4 were used in the various preparations. Results of the administration of these samples are set down in table IV to illustrate what I have long believed: that only antigens which yield a good initial conversion-rate can be expected to produce a durable immunity in most subjects.

The fact also emerges that adequate Al PO_4 must be included in all preparations of P.T.A.P. if it is desired to bestow lasting immunity, since the parent toxoid in the five samples in table IV was the same in each case. I cannot explain the original slightly lower conversion-rate given by sample E as compared with sample D except on the grounds of chance and insufficiency of cases to show the difference between two fairly good samples of prophylactic. Nevertheless the trend of the results is clear throughout the table.



Results obtained in children aged 1 year with different toxoids: A, relatively impure (63% pure) freshly prepared (results previously reported [1]); B, relatively impure (60% pure) freshly prepared (see table I); C, a toxoid of great purity (93% pure) freshly prepared. No. of children: A, 419; B, 586; C, 413. Curve A is broken because fresh material was prepared to cover the higher range.

SUMMARY

Holt's diphtheria toxoid, P.T.A.P., seems to exercise the most successful action as a primary stimulant when the amount of Al PO_4 injected with each dose is about 7·5 mg.

Judging from tables I and III, it seems clear that purification of toxoid by Holt's process does not damage the antigenic properties of the substances even when 93% purity in terms of protein is achieved.

It seems that P.T.A.P. will stand a considerable amount of casual treatment, without suffering any notable antigenic deterioration. The value of this from the practical standpoint needs no emphasis.

Long-range Schick tests have shown that the immunity conferred by only minute doses of P.T.A.P. is well maintained at the end of two years; with normal doses of 15 Lf units, instead of 3 Lf as used in the above work, it seems probable that the antigen will give a very high degree of permanent basal immunity.

Prophylactics which yield the best results from the primary stimulus may be expected to produce good durability of immunity, and the converse appears to be equally true. Further, the durability of immunity is bound up with the use of a prophylactic containing an adequate amount of mineral carrier.

My thanks are due to Dr. A. Anderson, M.O.H., Heston and Isleworth, Dr. H. W. Barnes, M.O.H., Camberwell, and Dr. P. L. T. Bennett, M.O.H., Fulham, for many facilities in connexion with the work reported here.

Additional Note

L. B. HOLT*

The following comments arise from Dr. Bousfield's clinical findings reported above.

Laboratory experiments, using guineapigs, have shown that there was no significant antigenic difference in samples of P.T.A.P. which were of the same age, and the same Al PO_4 and toxoid contents, but in which the protein purity of the toxoid was varied between the limits of 25 to 95%.

P.T.A.P. is prepared with the purest toxoid which can be obtained with reasonable economic yield, and is of the order of 1700 Lf/mg. protein nitrogen—i.e., about 75% pure. Eventually it is hoped to develop methods

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whereby it will be possible to use toxoid at least 95% pure for general issue.

A major object behind this effort to obtain very highly purified toxoid is to be able to prepare a diphtheria prophylactic of very high antigenicity, and one employing the absolute minimum amount of diphtherial protein, in order that subjects of all ages may readily be immunised with the minimum of reaction in hypersensitive individuals.

It has been found by experiments on guineapigs that P.T.A.P. increases in antigenic potency on storage.

In regard to storage, the Therapeutic Substances Act lays it down that the date of manufacture shall be stated on the label of each package of diphtheria prophylactic but it defines the date of manufacture as the date when the product is released from cold storage (with a time-limit from the date of actual preparation). The date of manufacture which appears on the label of the bottle of P.T.A.P. is that on which it is removed from the refrigerator after having been matured for at least six months.

ANTISTIN
IN THE TREATMENT OF ALLERGIC DISEASES

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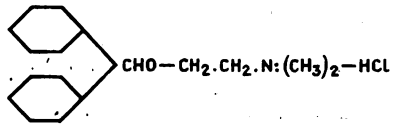
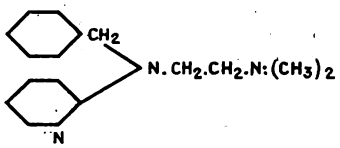
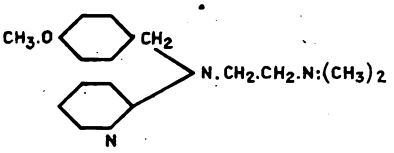
SINCE Fourneau and Bovet (1933) showed that certain phenolic alkylamine ethers had histamine-inhibiting properties in guineapig's intestine preparations, much research has been carried out on this subject. At present some five effective anti-histamine drugs have been synthesised: 'Benadryl'; 'Pyribenzamine'; 'Neoantergan'; malleate of neoantergen or 'Anthisan'; and, latest of all, 'Antistin,' which is 2-(N-phenyl-N-benzylaminomethyl)-imidazoline. Only benadryl, anthisan, and antistin are generally available in this country. They all have some chemical relationship to one another, as is evident from their formulæ:



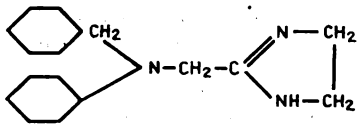
Benadryl



Pyribenzamine



Neoantergan



Antistin

They all have a similar anti-histamine action as shown by their protective value in the prevention of anaphylactic shock in animals. Unfortunately all of them cause various unpleasant side reactions which limit their use in certain patients. These side reactions vary from patient to patient and with the different drugs. Thus some patients may suffer severe side reactions from, say, benadryl but none from antistin, and vice versa.

RESULTS OF TREATMENT OF ALLERGIC CONDITIONS WITH ANTISTIN

Condition	No. of cases	Great benefit	Moderate benefit	No benefit	Reactions
Hay-fever	30	15	7	8	12
Urticaria	11	3	2	6	4
Vasomotor rhinitis ..	10	3	5	2	4
Pruritus ani	1	1	—	—	—
Allergic conjunctivitis	1	1	—	—	—
Migraine	1	1	—	—	—

Two papers have been published on the use of antistin in allergic conditions. Bourquin (1946) found it of value in allergic conjunctivitis, and Schindler (1946) obtained good results in many of 39 cases of urticaria, pruritus, and asthma. Pharmacological details were published by Meier and Bucher (1946).

Of my own series of 85 cases treated with antistin, only 54 could be adequately followed up and had a complete course of treatment. Of the 54 patients 30 had seasonal hay-fever (pollinosis), 11 urticaria or angio-neurotic œdema, 10 vasomotor rhinitis, 1 pruritus ani, 1 allergic conjunctivitis, and 1 migraine. No cases of asthma other than hay-asthma are included in this study, since my experience of anti-histamine drugs in this disease has not been so favourable as with the more usual antispasmodic drugs, and indeed some cases have been made much worse. Some of the patients with hay-fever also had hay-asthma. This type appears to react more favourably to these drugs, and the asthma appeared to improve in parallel with the hay-fever when it was benefited.

The dosage prescribed in each case was one tablet (0·1 g.) given at night before going to bed and again in the morning before rising. If these caused no unpleasant reactions, the dose was doubled and then increased gradually, if symptoms of the condition still persisted, until relief was obtained or until a maximum of two tablets four times a day was reached. In all 50–60 tablets were given. If relief was not obtained within this limit, the drug was considered valueless.

The table shows that antistin was of benefit in 38 (70%) out of 54 cases. In all cases the condition relapsed at once on stopping the treatment.

Side Reactions.—In 20 (37%) of the 54 cases there was some type of unpleasant side reaction, and in 7 of these it was so severe that treatment with antistin had to be abandoned. The reactions came on at any dosage; but, though they were more common with the larger doses, a fairly severe reaction might develop with the first dose. The types of reactions in order of frequency were as follows:

Nausea	9	Coughing attacks ..	2
Drowsiness	4	Disorientation ..	1
Faintness	3	Depression and fever	1
Giddiness	3	Diarrhœa	1
Headache	2		

DISCUSSION

Antistin is an effective anti-histamine drug in many allergic conditions. Like the other anti-histamine drugs it does not cure; so desensitisation remains the only method for clinical cure in most cases of extrinsic allergy.

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The place for anti-histamine drugs is during the period of investigation and until the desensitisation has reached a sufficient level to limit the symptoms. In many cases of intrinsic allergy, or where the offending allergen cannot be discovered, these drugs are invaluable.

The severity of the side reactions in some cases indicates the imperative need for beginning with a small dose and increasing it slowly. This fact must be emphasised, since deaths have been reported following the use of anti-histamine drugs. In these cases it appears that the patient was not sufficiently warned of the possible side effects and had taken a high dosage from the beginning. The side reactions to antistin appear usually to be of a type which are less troublesome than the disorientation and severe drowsiness commonly found with some other members of this group, but all the anti-histamine drugs are safe if the initial dosage is kept low and the patient is warned. I have found that antistin can be used with good effect in cases where benadryl or other drugs of this group have failed or have caused severe side reactions. Conversely, excellent results may sometimes be obtained with the other anti-histamine drugs when antistin has failed.

SUMMARY

In 37 of 54 cases of hay-fever, urticaria, vasomotor rhinitis, and other allergic conditions, antistin gave much relief.

Side reactions developed in 20 of the 54 cases, but only in 7 were they so severe that the antistin had to be stopped.

With all anti-histamine drugs, the patient should be warned of the possibility of side reactions. The initial dose should be kept small and the dosage increased slowly. The first dose and any increases should be given at a time when the patient will not be called on to perform skilled movements depending on acts of judgment—e.g., driving a motor-car.

I am indebted to Ciba Laboratories Ltd., Horsham, for supplies of antistin.

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Preliminary Communication

PARA-AMINOSALICYLIC ACID IN TUBERCULOSIS

EARLY RESULTS OF CLINICAL TRIALS

AMONG a series of benzoic- and salicylic-acid derivatives investigated by Lehmann [1] in Sweden, *para*-aminosalicylic acid (P.A.S.) was found to have the most active bacteriostatic action on the tubercle bacillus and to be relatively non-toxic to animals (except guineapigs). It was then used in human tuberculosis in Sweden by Vallentin,[2] in whose opinion the results were "fairly promising."

A new method of synthesising this compound was evolved by Mr. D. E. Seymour (director of research, Herts Pharmaceuticals Ltd.) in 1946, and, after further toxicity tests in animals, a sufficient quantity of P.A.S. became available for clinical trials to be started at the Grove Park Hospital in March, 1947.

To maintain a blood-level of at least 10 mg. per 100 ml. it was estimated provisionally that each case treated by mouth would require 80–140 g. of P.A.S. every week (we still consider this dosage advisable for parenchymatous lesions), but owing to unavoidable manufacturing difficulties continuity of treatment in such dosage has not always been possible. It was found, however, that small quantities of P.A.S. (1·5–3·0 g. weekly, as a 10% solution in sterile distilled water) had an effect on empyemata, &c., when applied locally to the pleural space; hence 9 cases have received the drug in this way alone. Two intrathecal injections, each of 0·5 g. in a 5% aqueous solution, were given, together with oral dosage, in our single case of tuberculous meningitis complicating extensive pulmonary disease. No undue disturbance was noted by such methods of medication, except that high dosage of the acid itself given by mouth produced nausea and vomiting; but this effect has been slight since we have substituted the sodium salt.

Up to date, 19 patients in the hospital have received P.A.S. All of these patients have pulmonary tuberculosis but only 6 were given the drug as treatment for their pulmonary lesions; thus these 6 cases will be referred to as the "pulmonary series."

PULMONARY SERIES

We tried to choose cases demonstrating infiltration without cavity, single cavity with little infiltration, pneumonic, miliary, or fibrotic lesions, but no case was chosen for P.A.S. treatment unless we had evidence that the disease was active (sputum-positive) and progressive during an observation period of at least two months immediately preceding the start of the drug.

No definite conclusions can be drawn from this small series, but the drug does seem to have had a beneficial effect. Within a few days of the first dose the temperature and erythrocyte-sedimentation rate (E.S.R.) fell sharply, and this improvement was maintained unless the treatment was interrupted, when both temperature and E.S.R. rose towards their former level until a further course was given, when they again fell immediately; these falls in temperature were not attended by sweating. More slowly—i.e., over a few weeks—there was a fall in the pulse-rate and an increase in weight, vital capacity, and hæmoglobin content of the blood. The quantity of sputum rapidly decreased in each case, with a striking reduction in the number of tubercle bacilli present. The morphology of the bacilli also changed; beading and striation were noted, and acid-fast granules appeared which persisted for a considerable time after ordinary bacilli had disappeared (for record purposes such sputum was still regarded as "positive"). These responses to treatment were accompanied by improvement in the general condition and in the radiological appearances; particularly striking was the reduction in size of some pulmonary cavities during medication.

COMPLICATING LESIONS

Renal Tuberculosis.—One woman was treated with P.A.S. by mouth for tuberculosis of the upper pole of her left kidney, confirmed by retrograde pyelography and by finding albumin, pus, blood, and tubercle bacilli in the urine. From the 12th day onwards no further tubercle bacilli appeared in the urine, but pus, blood, and albumin persisted until the 11th week when the urine finally became clear. She has had no recurrence of renal signs or symptoms up to date—i.e., six months afterwards.

Meningitis.—Our one case of tuberculous meningitis complicating pulmonary tuberculosis (the diagnosis was established by lumbar puncture and confirmed by autopsy) was treated by mouth and with two intrathecal injections. His meningitic symptoms became virtually negligible within twelve hours of the commencement of P.A.S. and remained so throughout treatment, while we thought that his life was slightly prolonged by this medication, particularly as he died within thirty-six hours of its cessation.

Enteritis.—Recently one patient, with miliary spread and deteriorating rapidly, developed tuberculous enteritis;

1. Lehmann, J. *Lancet*, 1946, i, 15; *Svenska Läkartidn.* 1946, **43**, 2029.
2. Vallentin, G. *Svenska Läkartidn.* 1946, **43**, 2047.

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no great improvement has been achieved so far in her general condition, but the first fortnight's administration of P.A.S. by mouth has reduced the frequent diarrhœa to one semi-solid stool daily, besides alleviating the pain.

Monaldi Drainage.—One patient, being treated by Monaldi drainage for a large apical cavity, had P.A.S. mucilage instilled daily direct into this cavity and left for eight to twelve hours without suction; the discharge was appreciably diminished, but nothing further can yet be claimed for the case.

Empyemata, &c.—Of 9 patients treated by local instillation of P.A.S. into the pleural cavity for tuberculous empyemata, 3 had open sinuses in the chest wall, another had a bronchopleural fistula in addition to a sinus, and 1 had a bronchopleural fistula but no sinus. The results obtained in these cases have been particularly rapid and striking.

The first patient in whom this method was tried had a chronic tuberculous empyema with a bronchopleural fistula; open drainage had been employed for two years before thoracoplasty and the fistula, sinus, and empyema cavity had then remained open for ten months. A 5% suspension of the pure acid in water was inserted into the empyema cavity which was then sealed for three days, and this treatment was repeated a fortnight later. Within a month of the original injection of P.A.S. the chest-wall sinus had healed, the patient's symptoms of bronchopleural fistula had gone, and by X-ray examination the pre-existing empyema cavity could no longer be seen, nor could pus be detected by needling. Without further treatment this man has worked at his former occupation for the last four months and his recent film shows no sign of relapse.

In another man multiple sinuses have healed, and there is evidence of commencing healing in 2 further similar cases. In the remainder the empyemata have either been obliterated or (in the later cases) are showing a definite tendency towards this end; in the latest bronchopleural fistula the lung is re-expanding, though the fistula remains patent, and spread in the contralateral lung has been checked. In these empyemata, radiological examination suggests a deviation from the usual mechanism of re-expansion, and a proliferation of deposit (probably fibrinous) on the parietal pleura.

In the ordinary way we would have expected at least 3 of this group to have needed a thoracoplasty for the obliteration of the empyema space, but this operation would probably have been postponed because of multiple sinuses, emphysema, contralateral disease, &c.; time saved for the patient must also be taken into account in assessing the value of the drug. Further, even with the small dosage employed, the beneficial effects of P.A.S. on the empyema, &c., have in most cases been accompanied by improvement in the pulmonary lesions; as yet no patient in this series has shown symptoms of retrogression since P.A.S. was begun as a "local application."

CONCLUSION

Time alone can determine the stability of the results so far achieved with P.A.S. But we feel justified in recording the beneficial effects noted in these patients with various tuberculous lesions, and in suggesting that the improvement has seemed to be more rapid than with previous methods of treatment.

We wish to thank Herts Pharmaceuticals Ltd. for the *para*-aminosalicylic acid, and its sodium salt, used in these preliminary trials.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Carcinoma of the Breast

AT a meeting of the section of surgery on Dec. 3, with Sir MAX PAGE, the president, in the chair, a discussion on the treatment of carcinoma of the breast was opened by Sir GORDON GORDON-TAYLOR. Tracing the evolution of treatment, he paid special tribute to pioneer workers at Middlesex Hospital, including Charles Moore, Sir Alfred Pearce Gould, and W. Sampson Handley. Sir Gordon's own surgery of mammary cancer has been largely modelled on that of Handley; but he has not followed Handley in the employment of radium at the time of operation or in the use of postoperative radiation. On over a dozen occasions he has deliberately removed the chain of anterior mediastinal glands along with the internal mammary vessels after resection of the 2nd and 3rd costal cartilages; in retrospect he regrets that he has not more often performed this manœuvre.

Confidence in preoperative and postoperative irradiation must tend to curtail the extent of surgical ablation. In 1938 four different procedures prevailed among 72 surgeons throughout Britain: (1) 25% undertook radical operation without irradiation; (2) 44% employed irradiation as a supplement to radical operation; (3) 29% used irradiation after radical operation in group 2 cases only; and (4) 2% favoured irradiation with or without a local operation. Since 1938 the exigencies of war have thrust much of the treatment on to radiotherapeutic clinics. Sir Gordon eschews postoperative radiation for cases in groups 1 and 2; "For such I have preferred a sharp knife, a stout heart, and unquenchable optimism." He was emphatic, however, that when the condition has advanced beyond stage 2, and for treatment of supraclavicular glands and bone metastases, radiation is the method of choice. Even among those who advocate routine ancillary radiotherapy there is no unanimity as to indications or method. Stuart Harrington found that, whether there was axillary-gland involvement or not, there was no appreciable difference in the 10-year survival-rate between those receiving radiotherapy and those who did not receive it. Truscott concluded that between 1926 and 1935 treatment was best when surgery alone was employed, and that from 1935 onwards the evidence was insufficient to say whether the combination of radiotherapy with surgery is better than surgery alone.

Few papers dealing with radiation refer to the morbidity from this treatment. Apart from unhappy local effects, sickness and other untoward sequelæ may lower resistance to any malignant cells remaining after operation. Recurrence has taken place as long as 32 years after operation; in some no causal factor, except perhaps age, can be impugned as fostering the recrudescence; but in others recurrence appears to have been preceded by intercurrent disease or by surgical operation for some independent condition. Sir Gordon has seen a recurrence in the scar 17 years after a radical mastectomy and a few weeks after a severe attack of acute pyelonephritis; he has also seen recurrence in the scar follow an operation for hæmorrhoids performed 16 years after the initial amputation. In three cases recurrence manifested itself shortly after a gall-stone operation, while in another patient recurrence seemed to be related to a herniorrhaphy performed under local anæsthesia. "Cancer immunity," after being broken down, seems sometimes to be restored, and Sir Gordon has seen patients survive recurrence for as long as 10 years. The vagaries of this "immunity" or "resistance" are seen in alternating efflorescence and retrogression or disappearance of cutaneous nodules and even of invaded lymph-glands; while preternaturally slow growth of a mammary tumour and the protracted absence of metastases are indicative of the same cancer resistance. Still more amazing is the disappearance of a cancerous mammary growth and its secondaries.

Investigation has shown that the average natural duration of untreated cases of mammary cancer is about $3\frac{1}{2}$ years. Treatment should, therefore, be gauged by the

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10-year survival-rate. Of his total of 644 cases of primary cancer of the breast submitted to radical operation, 363 were treated up to June, 1928; and among these the 10-year survival-rate was: group 1, 84·07%; group 2, 29·4%; group 3, 6·5%. Almost without exception the conclusions of the surgeon-radiotherapist "combines" are based on 5-year survival-rates;" when their figures at 10 years convincingly surpass those which I have given from radical surgery alone, I may then be prepared to solicit the routine aid of radiotherapy for the group 1 and group 2 patients."

RADIOTHERAPY

Dr. ROBERT MCWHIRTER discussed the 5-year follow-up of 2809 cases referred to the Royal Infirmary, Edinburgh, between 1930 and 1945. In 364 operable cases (stages 1, 2, and 3, Manchester classification) treated between 1930 and 1934 by radical operation alone, the number developing recurrences in the chest wall, axilla, and supraclavicular region of the affected side was almost 40% within 5 years of operation; in this proportion the operation was doomed to failure because the disease was not eradicated locally.

This observation led, in 1935, to the adoption of postoperative radiotherapy, as a result of which the percentage of local recurrences within 5 years was reduced from 40 to 14; and the 5-year survival-rate was raised from 37% to 51% in the treated cases.

The trauma of the operation and the opening up of tissue planes, especially in the axilla where an "en-bloc" dissection is difficult to perform and where many lymphatic trunks must be cut across, suggest that malignant cells may be disseminated before X-ray therapy can be applied. In an attempt to overcome this difficulty cases have been treated since 1941 with simple mastectomy followed by postoperative radiotherapy. Cells may still be liberated when a simple mastectomy is performed, but these are unlikely to pass the intact barrier of the axillary drainage system; and by not dissecting the axilla the risk of dissemination from the axilla at operation is eliminated. Moreover, the average interval before X-ray therapy is started is shorter after simple mastectomy than after the radical operation. Keynes has achieved good results by a method which is essentially the same except that he used radium implantation.

Dr. McWhirter underlined the importance, in assessing the value of treatments, of relating results not simply to the cases actually treated but to the number of cases to which the method can be applied. A true comparison can be obtained only by expressing the number of survivors from each method as a percentage of the total cases referred, irrespective of the treatment used. By these standards the 5-year survival-rate of all operable cases treated by radical surgery is 35%, and of all cases, operable and inoperable, 20–25%. Moreover, he said, his figures refer to a large general hospital and include many advanced cases.

The following 5-year survival periods have been obtained in operable cases: 1930–34 (radical surgery only) 35·6%; 1935–40 (radical surgery and postoperative radiotherapy) 44%; 1941–45 (simple mastectomy and postoperative radiotherapy) 56·0%. This gives statistical support to the belief that by not dissecting the axilla the risk of disseminating cells is reduced. Confirmation is forthcoming from the results in inoperable cases, though it was not possible or advisable to treat all of these by the methods adopted for each period. In 1930–34 no inoperable case survived 5 years; in 1935–40 only 2·5% survived for this period, which suggested that postoperative radiotherapy was rendered ineffective by dissemination of cells at the time of operation; lastly, in the period 1941–45 the 5-year survival-rate was 14·1%—or, if the localised inoperable cases are taken alone, 24·6%.

Analysis of all cases referred to the Royal Infirmary in the 1935–40 period shows that among a total of 790 operable and inoperable cases the 5-year survival-rate was 32·4%; and among 1345 cases in 1941–45 the rate was 43·2%. When the cases with evidence of distant metastases are excluded, the 5-year survival-rate for 1941–45 is 50·1%; and this figure is the more remarkable when it is borne in mind that not all cases, even in the operable group, were treated by simple mastectomy and radiotherapy.

At the Royal Infirmary the technique of simple mastectomy and postoperative radiotherapy is being continued, with the addition of X-ray therapy to the ovaries in women over the age of 35 with a view to influencing distant metastases.

Dr. McWhirter concluded with the following points in procedure: (1) preoperative preparation by iodine is contra-indicated; (2) the skin incision should be as short as possible; (3) tension on skin flaps may delay healing and the application of radiotherapy; (4) where the primary tumour is mobile on the pectoral fascia, the fascia should not be removed; (5) if there are no palpable axillary glands no dissection should be performed, but superficial mobile glands in the subpectoral region may be removed; (6) if the patient is very stout it is better to carry out a radical operation; (7) supraclavicular glands should never be removed; (8) adhesive should not be applied to the skin. In postoperative radiotherapy: (1) only one full course of X-ray treatment should be given; (2) X-ray treatment should be begun as soon as possible after operation—usually 2 weeks after; (3) the chest wall must be treated by tangential or glancing fields to avoid lung fibrosis; (4) an adequate dosage must be given; (5) the above method should not be used with an apparatus of lower voltage than 250 kilovolts since an adequate depth dose cannot be delivered to the axilla.

ASSESSMENT OF RESULTS

Sir STANFORD CADE said that the peak incidence of cancer of the breast is in the 55–60 age-group; and he therefore chose 55 years as the age at which to consider expectation of life in connexion with the disease. The breast is the least rapidly lethal of all sites of cancer—a consideration which should affect the choice of treatment. The mean duration of life in untreated cases is 39·3 months. Major Greenwood found actuarially that for a women of 55 the normal expectation of life was 18·87 years; with untreated cancer of the breast it was 3·8 years; with cancer of the breast treated under average conditions it was 5·78 years; while with cancer treated under the best conditions it was 12·93 years. The qualifications "best" and "average" are determined by (1) the stage of the disease, and (2) the type of treatment; and these two factors are the key to an unbiased assessment of treatment methods. Of all factors affecting prognosis, stage of the disease is the most important; and the following classification was suggested:

Stage 1: Tumour of the breast only.

Stage 2: Tumour of the breast, plus skin changes and/or axillary glands.

Stage 3: Tumour of the breast, plus supraclavicular gland or contralateral axillary gland or fixation to pectoral fascia.

Stage 4: Skeletal or visceral metastasis.

The zone of demarcation between good and evil prognosis is the clinical state of the axillary glands. The treatment of choice for stage 1 cases is radical mastectomy; and postoperative radiation in this group is of very doubtful value. The operative mortality is very low; in over 11,000 cases operated on in British teaching hospitals the rate was only 1·65%. In stage 2 operation alone offers a chance of 5 years' survival in only about 20–30% of cases. This group comprises three types of skin invasion: (1) direct spread and fungation, which is the least malignant; (2) diffuse invasion with œdema, which is of grave significance; (3) invasion of the skin by discrete nodules, which is a death sentence. With the last two types of skin involvement incalculable harm is done by radical mastectomy. Here radiation is the weapon of choice, and it converts some cases to group 1.

Simple mastectomy is suitable to the aged, for the removal of a fungating mass, in bad surgical risks with localised disease, and in cases where radiation is not available or suitable; but as a routine surgical procedure simple mastectomy is a retrograde step and is quite unwarrantable. Radiation is of value: (1) as the sole treatment in stage 3 cases; (2) as a preoperative measure in stage 2 cases; and (3) as a postoperative measure, chiefly in stage 2 cases. Methods should not be allowed to deteriorate: "If women are to be mutilated by amputation of the breast, let them at least derive the maximum benefit from such mutilation."

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INTERCOSTAL GLANDS

Mr. R. S. HANDLEY said that, in association with Dr. A. C. THACKRAY, he had been removing the 2nd space intercostal gland of the internal mammary chain from cases of mammary carcinoma, to discover the frequency with which the internal-mammary glands are invaded. The 2nd space was chosen because it contains the largest and most constant gland of the internal-mammary chain. In 20 cases so far examined in this way, glandular involvement was found as follows: no glands 6; axillary glands 3; intercostal glands 2; axillary and intercostal glands 9. No intercostal gland larger than an orange pip has been found; but invasion of the space is nearly always detectable by the matting of the tissues around the internal-mammary artery. It is difficult to believe that carcinoma cells lying almost on the pleura can be harmless. If the intercostal glands are invaded, the patient clearly cannot be cured by surgery alone; additional radiotherapy is needed, and it is doubtful if radical mastectomy is then indicated. Recently Mr. Handley has done two or three cases in which the first step was a 2nd intercostal-space biopsy; if from a frozen section it was found that the space was invaded, the operation was confined to simple mastectomy.

Reviews of Books

The Human Approach

A Book for Medical Students. HENRY YELLOWLEES, M.D., F.R.C.P., physician for mental diseases, St. Thomas's Hospital. London: J. & A. Churchill. 1946. Pp. 189. 10*s.* 6*d.*

MEDICAL students will find here a vigorous and frankly personal statement of what one experienced psychiatrist thinks should be their outlook on psychological medicine. The author appears as a man of strong likes and dislikes, with a gift for homily. He warns the student not to feel alarm or elation if some statement in the book seems somewhat inconsistent with a previous or later statement; and indeed the style is free of any dry-as-dust liking for impersonal precision. The book contains a lot of shrewd advice, sometimes amusing, sometimes provoking, and continuously lively. There can be no doubt that many students will be pleased to meet here a psychiatrist who has definite views which are useful in practical life, by no means abstruse or far-fetched, and expressed moreover in colourful simple language.

Hypnoanalysis

LEWIS R. WOLBERG, M.D., lecturer in psychiatry, New York Medical College. London: W. Heinemann. 1946. Pp. 342. 21*s.*

IN psychological treatment the notion of catharsis as the essential curative process has gained wide acceptance: it is easy to grasp, because of its physical and philosophical associations, and many psychiatrists are impressed by dramatic instances of its occasional efficacy. Freud and many of his followers have stressed the limitations of the cathartic method, but abreaction still figures largely in the reports by non-Freudian psychotherapists of how their patients—especially their war-time patients—were made well. Narco-analysis and hypno-analysis are methods employed to facilitate the conscious recall of the memory of painful events; but Dr. Wolberg makes it clear that this is not the sole or primary aim of his method, in which hypnotism is brought in as a technical device for making psycho-analysis smoother and quicker, because less obstructed by resistance on the patient's part. The ingenuity and resource of Dr. Wolberg in conducting the hypno-analysis of Johan R. (the gifted schizophrenic patient to a detailed account of whose treatment the first half of the book is devoted) is of such obvious value at every stage of the procedure that hypno-analysis emerges as yet another variety of psychotherapy whose success depends rather more on the talents of the practitioner than on the particular practice he adopts. Nevertheless hypno-analysis is a technique with many advantages, as Lindner, Erickson, and some others have shown, and it is wholly to be welcomed that such a promising development in psychological treatment should be put on record, in straightforward language, to enliven the current literature of individual psychotherapy, with its intricate polemics and reports of triumphs. In part 2 the rationale of the hypno-analytic technique is fully discussed, with illustrations drawn from Dr. Wolberg's experience of other subjects besides Johan R. Neither the explanations nor the claims are extravagant. There is also a reflective critical interpretation, by Dr. A. Kardiner, of the dynamics of the therapeutic process in Johan R. Altogether this book has the merits, especially to be prized in works on psychotherapy, of having something comprehensive, balanced, and fresh to say.

Old Age: its Compensations and Rewards

A. L. VISCHER, DR.MED. With a foreword by Lord AMULREE, F.R.C.P. London: Allen & Unwin. 1947. Pp. 200. 12*s.* 6*d.*

THIS translation of a remarkable book published in Basle in 1942 is overdue; but its appearance is happily timed with the final emancipation of the aged poor from the degradation of the workhouse (which Sidney Webb just lived to see). The old people's hostels adjoining the municipal hospital in Basle may well serve as a model for our health authorities, and Dr. Vischer might be able to find Mr. Bevan a name for them that carries no slur. The delay has perhaps had something to do with the attractive format of the book and with Bernard Miall's sensitive and accurate rendering of the author's style. This matters more since the subject matter is not so much geriatrics as the wider gerontology, and the translation should appeal to a wide circle of readers among the elderly, to many of whom the original brought consolation and encouragement. Doctors who have not time to digest Cowdry's massive collection of essays on the *Problems of Ageing* will find in Dr. Vischer's work the physiological and psychic questions stated, if not fully answered.

Occupational Diseases of the Skin

(2nd ed.) LOUIS SCHWARTZ, M.D., medical director, United States Public Health Service, chief of dermatoses section; LOUIS TULIPAN, M.D., clinical professor of dermatology and syphilology, New York University; SAMUEL M. PECK, M.D., dermatologist, Mount Sinai Hospital, New York City. London: H. Kimpton. 1947. Pp. 964. 63*s.*

IDEALLY all pictures of skin lesions should be in colour, though no doubt this is expensive. The second edition of this good book has 140 black-and-white illustrations to only one colour plate, and some of the uncoloured photographs do not give accurate impressions of the lesions. The authors provide fascinating and sobering accounts of the risks to which workers' skins are subjected by various irritants, and discuss fully the treatment and prevention of occupational dermatitis. The occupational skin diseases of the medical and allied professions are not often so well described as they are here, and a glance at the photographs of radiodermatitis in a physician, formalin dermatitis in an anatomist and in a morgue-keeper, procaine dermatitis in a dentist, potassium mercuric iodide dermatitis in a nurse, and verruca necrogenica in a post-mortem attendant might well give pause to aspirants to these professions. Tested for information on specific subjects the book usually passes with honours. Thus the differential diagnosis of fungus infections of the skin from industrial dermatitis is given in satisfying detail. Compensation for industrial dermatitis is considered mainly from the American angle, though a brief reference is made to the position in Great Britain and elsewhere; in all other respects the book is as useful a reference book in this country as in the United States. Its value lies in the authors' extensive first-hand experience of occupational skin lesions as well as in their exhaustive reading of the contributions of other people and of other countries.

Bamford's Poisons: Their Isolation and Identification (2nd ed. London: J. & A. Churchill. 1947. Pp. 304. 21*s.*).—The second edition of this useful laboratory manual for chemists who have to deal with cases of poisoning has been prepared by Mr. C. P. Stewart, PH.D. He has followed the practice of Mr. H. F. Bamford, the original author, in describing methods which he knows, by personal experience, to be reliable, and—apart from adding some notes on the preparation of reagents—he has left the scheme for the identification of alkaloids.

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THE LANCET

LONDON: SATURDAY, DEC. 13, 1947

Niceties of Social Work

THE general practitioner is daily faced with the presenting symptoms of social maladies which he has no time to study and treat. There is the girl complaining of constipation, who works in an office, lives in lodgings, knows nobody, and takes no proper food or exercise; or the old man living alone, not ill, but beginning to find household chores too much for him; or the woman whose occupation has gone because her children have married and left home, and she has formed no other interests; or the child with the mild behaviour disorder who looks like getting into trouble but has not yet done so. Such people, as Dr. BERYL HARDING [1] has suggested, could readily be helped by some friendly woman who knows the social resources of the neighbourhood. Work of this kind, she argues, should not take up the time of a highly trained person, whether health visitor or almoner; and it might be done, she thinks, by part-time voluntary helpers under skilled supervision.

The problem is more complex than appears at first sight; for social workers in various fields tell us that though voluntary helpers sometimes work harmoniously under trained staff—especially in areas where such an arrangement is traditional—the commoner end is disharmony, either because the voluntary helper is over-confident and cannot accept guidance, or because the trained worker is officious and overbearing. Nor can a new voluntary helper quickly learn precisely what resources are there to be tapped. Our social services and amenities seem to have some congenital anomaly of coördination which renders them ataxic, dysarthric, and full of good-intention tremors. It may be that once they are supported by the spinal brace of the National Health Service a few remedial exercises will work wonders, but in the meantime no single person in an area seems to be fully informed of their scope: certainly not the general practitioner, nor even, we are told, the medical officer of health. They are therefore exceedingly difficult for the lay newcomer to master. Even under the supervision of an almoner or a health visitor, a voluntary helper would not live up to her name until she had had several months' guided experience, and it is doubtful whether time can be spared by trained staff to teach her.

What other solutions present themselves? Who must be responsible for ascertaining cases? It is the doctor who often hears the story first. But for the next ten years at least doctors are going to work harder than ever, and they are going to have less opportunity to deal with even the urgent problems, let alone the vague preliminaries of ill health. This is especially unfortunate at a time when students and practitioners alike are beginning to have their minds more attuned to prevention. But if we cannot do what we would, we must be content to do what we can. Even if we had an army of health visitors or other social workers they could hardly accost passers-by with the query "Do you need help?" Clearly, then, the doctor's surgery will remain the catchment area for such cases; and rightly, for their care is a part of medicine. This being so can the doctor be given some hint to follow up, when he sees a patient for the first time? At health centres, a receptionist trained in taking social histories could be of very great service to him; her few informative lines at the top of the case-card would save him much preliminary skirmishing, and also from asking unnecessary questions. And would it not be possible for a mature and diplomatic secretary to do much the same thing for the doctor in his own surgery?

When the doctor has got the facts, what should be his next move? Sometimes he may himself be able at once to suggest the remedy—to put the patient directly in touch with a youth leader, an old people's club, a night school, a cycling club, a dramatic society, or a child-guidance clinic. More often, as things stand, he will be at a loss, simply because, at present, he has no means whatever of keeping track of the activities and services and amenities available in his area. It would, we believe, be a valuable public work on the part of the British Medical Association to make surveys of all such facilities, up and down the country, and to supply their members with local directories describing them. These directories would probably be no less welcome to medical officers of health than to doctors in practice. Where the practitioner cannot give an answer out of his own knowledge he should, in our view, get into touch, preferably by telephone, with the M.O.H., who should suggest the right person to give help and advice. If the M.O.H. has an almoner on his staff—as many now do—he may ask her to visit the patient; or he may think the case more suitable to pass on to the education department; or he may ask the health visitor to take it over. Health visitors and almoners, however, like doctors, are going to be very scarce for many years to come. Either of them may find it impossible to see personally every patient referred to them, and we agree with Dr. HARDING that, provided it is given acceptably, they should be grateful for the help of volunteers. We suggest that the health visitor should form the habit of telephoning to voluntary organisations which might help her—for example, the British Red Cross and St. John Ambulance Brigade, and the Women's Voluntary Services—and asking them to look after selected cases, reporting to her when further help is needed from her department. This system of mutual coöperation between the voluntary and municipal organisations seems more likely to succeed than any plan by which voluntary helpers are placed formally under the direction of social workers. Probably the voluntary bodies would respond well to this coöperative approach, and would make a useful study of the social amenities of the neighbourhood; moreover, the health visitor would be able to select only the cases she thought appropriate for treatment along the lines followed by the voluntary organisations. It is worth noting, besides, that in some areas there is already a council of social service which could doubtless give first-hand advice on the facilities of the area, both to doctors and health departments. The present need surely is not to

1. *Lancet*, Sept. 27, p. 488, and Nov. 8, p. 702.

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multiply agencies, or create competition for lay helpers, but to use more smoothly the nerves and muscles of our existing social service. Ultimately this can only be achieved by individuals; and under the National Health Service social medicine, far from becoming more impersonal, will depend more than ever on the ability of individuals to work together. It is for the doctor to get to know his M.O.H. as his colleague in the other department; for the M.O.H. to get to know his doctors as his colleagues in the field; for both to get to know the social amenities and services on which they can lay their hands; and for almoners and health visitors to multiply as fast as they can, since they are the eyes, ears, and tongues—the scouts, the field telephone, and the intelligence department—of the health service.

Can We Afford It?

WHEN the National Health Service is discussed in relation to the country's rather shaky finances, the cry inevitably arises—can we afford it? Sometimes the man who raises this cry is under the mistaken impression that under the present system the medical services cost scarcely anything: he does not understand that most of the charge which is in future to be borne by the citizen as contributor and taxpayer now falls on the citizen as patient and supporter of charities. Even so, the question can still be fairly asked; and, putting aside all humanitarian considerations, some sort of attempt can be made to answer it. What has first to be decided is the amount of money, lost through illness, which the medical services might be expected to save. The Social Survey report on morbidity[1] shows that, in a cross-section of the population of working age, up to 18% in any month may suffer from some ailment which disables them for at least three days. The P.E.P. report on the health services[2] stated that the loss of nearly 30 million working weeks accounted for by patients included under National Health Insurance in 1933 represented a gross under-estimate of the wastage from sickness in the population as a whole; yet even this loss cost at least £60 million in the year. The total real loss is difficult to assess, comprising as it does not only the lost produce of these idle hands but also the cost of medicinal and hospital treatment and of compensatory payments. Serious as is the loss of income through illness, the death of the wage-earner is too often a financial catastrophe for his family; and the postponement of death, like the prevention of disease, is thus of economic as well as human importance.

American statisticians have lately been computing the changes in "the money value of a man" brought about by recent advances in medicine.[3] Since the turn of the century, they say, the general death-rate in the United States—and experience in this country is similar—has declined by 40% and the "expectation of life" of a man has increased by about sixteen years. (Here the term is used in its technical sense as the number of years a child born, say, in 1900 would live were the death-rates then current to continue indefinitely.) At the death-rates for 1901, about half the men aged twenty would live to retire at sixty-five; at 1939 rates, about two-thirds would do so. If a man aged twenty had an average income of £312 per annum, the longer working life thus implied would increase his expected net earnings during his career from £6850 to £7475—i.e., by £625. Summed over all the men of his age-group the monetary value of the results of the application of scientific methods in prevention and treatment, is, to say the least, impressive. The accelerated advance of the past fifty years may be compared to the sluggish progress of the centuries before the age of modern medicine and hygiene. Rough calculations put the expectation of life in pre-Christian Rome at twenty-five years; in 1691 the same expectation for the inhabitants of Breslau was, according to Halley's first life-tables, about thirty-three years; for the American at the middle of the nineteenth century it had risen to forty years. Most of the dramatic decrease in mortality in the last half-century has of course been among infants and children; much less has been achieved for the older man whose earning capacity is at its peak.

Though the rapid pace of improvement in recent years can hardly be expected to continue, any fear that saturation-point has been reached is surely premature. As long as essentially preventable diseases like diphtheria exist, and as long as there are big social gradients in mortality, whatever the cause, there is scope for fresh endeavour in the field of medical care. But, like all else nowadays, it is a question of resources and priorities: how much have we been prepared to devote to the task in the past, and what of the future? Another American study[4] is relevant enough to pre-war circumstances here to be of interest. In the period 1935–39, it seems, 4·2% of the total U.S. consumer expenditure went on medical services of all kinds—rather less in fact than the outlay on either alcohol or recreation. Partly as a result of this expenditure, however, the American people obtained between 1900 and 1947 an increase of seven years in the normal expectation of life. Much of this betterment is due to a more hygienic environment, which is to some extent a by-product of applied medical science, but a great deal must be the result of new therapeutic methods. These new methods in their turn cost money, as the rising proportion of medical expenditure on drugs confirms. It was cheaper to treat the diabetic with codeine during his brief remaining spell of life than it is to increase his expectancy almost to normal limits by continued insulin medication; the opium pill and abdominal poultice were more economical, if less effective, means of treating appendicitis than the whole armamentarium of modern surgery. The long-term economic benefits of efficient medical care can be drawn only if the appropriate monetary investment is made.

To morbidity, as to mortality, these general principles apply. We are being exhorted to increase production by 10%, and to this achievement much could be contributed by even a small reduction in the enormous wastage of man-power due to illness. Typical potentially fruitful fields for further research

1. Survey of Sickness. October, 1943–December, 1946. Ministry of Health. 1947.
2. P.E.P. Report on British Health Services. London. 1937.
3. Stat. Bull. *Metropolitan Life Insurance Co.* 1947, **27**, 4.
4. Dickinson, F. G. Publication of the Bureau of Medical Economic Research, Chicago. American Medical Association. 1947.

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are the prevention of upper respiratory diseases, which bulk so much larger than even the commonest industrial poisoning, and the rapid convalescence and economic reablement of patients recovering from serious disease as well as injury. The exploitation of research in these and other sectors of medical care will need the diversion of men, money, and materials; but economic reasons in themselves give high priority to such work, and above all to further research. In the long run, as RUSKIN said, "there is no wealth but life."

Penicillin Stock Taking

PENICILLIN has passed from infancy to childhood and has successfully withstood most of the ills that affect the infant. The cynical advice to use a new drug while it still acts may have struck home here and there, but it is a fair claim that penicillin and the sulphonamides should be ranked as the two greatest contributions to the treatment of infection since salvarsan. Inevitably, however, the virtues of penicillin are now taken for granted, for virtue has no news value, and its deficiencies are receiving increasing attention. These deficiencies, from the doctor's viewpoint, are the need for parenteral injection, the rapid excretion so that injections have to be given frequently, the need to continue treatment for 4–7 days in most infections, and the fear that the drug is not today as effective as it first was. If these obstacles can be overcome there is little doubt that penicillin will become the drug of choice for a much wider variety of infections even than at present, since the almost complete absence of toxicity, even in enormous dosage, gives it a great advantage over the sulphonamides. Most of the allergic reactions are probably due to impurities and may be avoided by using the purer preparations now obtainable; but at a price, since the crystalline drug is much less potent against experimental streptococcal and pneumococcal infections than impure preparations.[1]

When given by mouth penicillin is poorly absorbed, either because of the action of the gastric acid or through destruction by penicillinase-producing bacteria in the gut. But MCDERMOTT and his colleagues [2] found that there was a wide variation in the acidity of fasting stomach contents and that absorption of penicillin was the same in achlorhydrics and in those with acid secretion. STEWART and MAY, in this issue, have further shown that only when the reaction of the stomach contents is below pH 3·0 is penicillin likely to be destroyed within 40 minutes and that destruction by penicillinase is unlikely since the upper reaches of the bowel do not ordinarily harbour penicillinase-producing bacteria. They conclude that absorption of penicillin from the alimentary canal occurs mostly in the duodenum, that the drug is best given in a small bulk of 5–10% glucose which may favour absorption in some people (and incidentally mask the bitter taste), that enteric-coated capsules give poor results, and that if an antacid is used sodium bicarbonate or citrate is preferable to the water-insoluble substances like kaolin or magnesium trisilicate. A most important finding of many workers on the absorption of penicillin by mouth is that best results are obtained if the drug is given half an hour to an hour before breakfast or about four hours after a meal. With a dosage of 50,000 units given at these times MARKOWITZ and KUTTNER [3] found that blood-levels in 55 out of 70 children aged 6–14 years were around 0·2 unit at 30 minutes and had fallen only slightly at one hour but to just detectable levels after two hours. In the remaining 15 children absorption was more variable and in some cases as little as 2% of the drug was excreted in the urine. Blood-levels were correlated to some extent with the weight of the child. The outcome of all these investigations is that oral therapy with penicillin is practicable, provided a dosage 5–10 times that used parenterally is given and that the drug is administered on a fasting stomach—that is, before breakfast or $3^1/_2$–4 hours after a meal. The pædiatrician has found oral therapy very useful in infections in infancy; this route has been used with success in acute gonorrhœa, and recently DOWLING et al.[4] have shown that penicillin by mouth is as effective as intramuscular dosage in the treatment of pneumococcal pneumonia.

The rapid excretion of penicillin, requiring doses 3–4 hourly, may be controlled either by injecting the drug in a wax-oil excipient which gives a depot effect, or by using some substance which will dam up its excretion by the kidneys. The *B.P.* preparation of penicillin in arachis oil and beeswax has not become popular, since it is difficult to inject and there has been some doubt about its safety and efficacy. The alternative method, by preventing excretion, has lately received encouragement by the discovery of another substance besides amino-hippuric acid which is apparently both safe and effective. This drug—caronamide [5]—is given by mouth and has the effect of raising the blood-levels of penicillin given by mouth or by intramuscular injection 2–7 times.

Emphasis has been laid by various workers on the need for continuing with penicillin treatment long enough to avoid any recrudescence of infection. The advantage of moderate doses continued for 3–4 weeks over much larger doses given for a shorter period was well demonstrated in the treatment of bacterial endocarditis, and many workers must have had the unhappy experience of seeing a relapse of a staphylococcal infection when therapy was stopped as soon as the temperature reached normal. But we still need more information about the value of intensive dosage of say a million units per day for 2–3 days in completely eliminating the infecting organisms—for example, in throat infections like streptococcal tonsillitis and diphtheria.

There remains the problem of penicillin-resistant bacteria, of which there are two kinds—the resistant variants of bacteria that are normally penicillin-sensitive, and organisms that have some natural resistance to penicillin—e.g., *H. influenzæ* and *S. typhi*. The staphylococcus is the principal, and perhaps only, pathogen with a high sensitivity to penicillin which can readily be made highly resistant in the test-tube, and there is some evidence that the proportion of resistant staphylococci causing human infection is on the increase. Thus BARBER [6] has

1. Hobby, G. L., Lenert, T. F., Hyman, B. *J. Bact.* 1947, **54**, 305.
2. McDermott, W., et al. *J. clin. Invest.* 1946, **25**, 190.
3. Markowitz, M., Kuttner, A. G. *J. Pediat.* 1947, **31**, 195.
4. Dowling, H. F., et al. *Amer. J. med. Sci.* 1947, **213**, 413.
5. Crosson, J. W., et al. *J. Amer. med. Ass.* 1947, **134**, 1578.
6. Barber, M. *Brit. med. J.* Nov. 29, p. 863.

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reported two series: 200 strains of staphylococci (of which 99 were from infected lesions) examined in 1946 yielded 12·5% strains resistant to 10 units of penicillin in an agar ditch-plate; whereas of 100 tested in 1947, all from infected lesions, 38 were resistant. It is, however, important to note that 28 of the 38 resistant strains were isolated from patients who had already had a considerable amount of penicillin; in other words, they were a selected group and conformed to the view that penicillin-resistant staphylococci are found far more often in patients who have been in hospital for some time than in new admissions. Some of these strains may come from patients who have been infected with a penicillin-resistant staphylococcus after admission, as happened in BARBER'S series, while in other cases they represent the survival of strains that are naturally resistant because of their capacity to produce penicillinase. In other (unpublished) series of cases examined at onset of infection the proportion of resistant staphylococci does not seem to be increasing rapidly, but obviously the danger of breeding resistant strains exists and needs attention. Two modes of attack may be suggested—to strike hard in the early stages of infection so as to knock out moderately resistant as well as sensitive strains, and if the infection does not respond within a few days to increase the dose still further; or to use combined chemotherapy of penicillin and sulphonamides (sulphathiazole is probably still the sulphonamide of choice for staphylococcal infections) with the object of preventing multiplication of the few resistant variants by the inhibitory action of the sulphonamide while penicillin is dealing with the bulk of the sensitive organisms. There is experimental backing for this second procedure,[7] which does not depend on synergism and which deserves more clinical trial, particularly in severe infections where treatment may have to be continued for a week or more. For infections due to partly resistant organisms, like the hæmophilus group, massive dosage seems to be the answer, as GOTTLIEB and FORSYTH [8] showed in their successful treatment with penicillin of a small group of cases of *H. influenzæ* meningitis. Similarly, discouraging or equivocal results in the treatment of typhoid fever with penicillin plus sulphonamides should not discourage further trials with larger doses, particularly if treatment can be begun early in the infection.

Coming Shortly

LAST week the Minister of Health met the Negotiating Committee and commented on the statement they had prepared for him. This statement, together with his written reply, will very shortly be circulated by the British Medical Association to every member of the medical profession and will also be issued to the press. Besides answering arguments put forward by the committee, the reply explains in detail how the Minister proposes to give effect to the recommendations of the Spens Committee on the remuneration of general practitioners, and deals broadly with the terms of service which will be offered them.

7. Klein, M., Kimmelman, L. J., *J. Bact.* 1947, **54**, 363.
8. Gottlieb, B., Forsyth, C. C. *Lancet*, Aug. 2, p. 164.

Annotations

CHRISTMAS FOR SOME

DOCTORS are generally well remembered at Christmas. Unless they have been misguided enough to choose one of the isolationist specialties, like pathology or radiology (or medical journalism), grateful patients waylay them with eggs, home-made wines, cheese sent by the friend abroad, and even the unforeseen goose or turkey. No-one would grudge the family doctor these tokens of friendship, since for most of the year he is hard-driven in the service of his patients; but he would need to be hard-bitten as well if his own deserved good fortune failed to remind him of others who are less lucky. The Royal Medical Benevolent Fund tries to remember all those doctors and dependants of doctors—mostly old and sick people—who are in need at Christmas, and to send those on its list a substantial Christmas cheque.

This is not an easy time for giving; but if we are all rather poor, there is the more need to lay out our money carefully, putting first things first. The healthy hardy doctor, well able to fend for himself and his family, will hardly fail to put the fund's Christmas appeal among the first things. The address is 1, Balliol House, Manor Fields, London, S.W.15.

INTELLIGENCE

Prof. Lewis M. Terman [1] describes two interesting pieces of American research on the development of superior intellectual ability. In the first a list was made of 300 "eminent" persons, from whose biographies their mental development was traced back to childhood. Three psychologists, intimately acquainted with the age norms of mental performance, independently estimated the lowest intelligence quotient (I.Q.) required for the recorded childhood achievements and assessed the value of the evidence on which the I.Q. was based. The average of these three estimates was used in stating the results. For the 300 persons the I.Q. ranged from 100 to 200 and averaged 155—i.e., more than three times the standard error above the mean of the general population. An I.Q. of 100–120 was found only when biographical details of childhood were scanty. The mean for philosophers was highest (170). Poets, novelists, dramatists, and revolutionary statesmen came next with 160, and were followed by musicians with 145, artists with 140, and soldiers with 125. Scientists achieved the mean for the whole group (155).

This digging up of literary fossils must be at best a chancy business, apart from the fact that a biography is usually a form of hero-worship apt to exaggerate childhood performances. More satisfaction is obtainable from the second experiment in which, in 1922, a school population of 250,000 was sifted to find children with an I.Q. of 140 or more. The number of such children discovered (more than 1050) was large enough to bear statistical analysis, and it became obvious that superior intellectual ability was associated not only with superior personality and character but also with superior physique. But the experiment did not stop there, for the history of those children has been followed. When they were retested in 1928 and 1936 the figures indicated that, in comparison with the general population, the rates of mortality, insanity, and divorce were low, while the suicide-rate was about the average. By 1940 71% had married and produced about 780 children, of whom 384 over the age of two years yielded a mean I.Q. of about 127, representing the expected regression towards the mean of the general population. In 1946 the mortality and insanity rates were still lower than those of the general population, and the delinquency-rate "extraordinarily

1. Psychological Approaches to the Biography of Genius. London: Eugenics Society and H. Hamilton. 1947. Pp. 24. 1s. 6d.

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low"; about 85% of either sex had married (a rate far above that prevailing among U.S.A. graduates) and they had produced more than 1500 children—not enough to maintain the stock. The average quality of these children, however, is considered very superior, the proportion of mental deficiency being about half, and the proportion with an I.Q. of 150 or more being many times that for the general population. Plans are being made to continue the follow-up of the entire gifted group until 1970 at least.

AGAINST RHEUMATISM

DURING the past year the Empire Rheumatism Council has extended still further its activities and influence. At the annual meeting in London last week Lord Horder, the chairman, told of a Canadian Arthritis and Rheumatism Society which is being formed along the lines of advice offered by the council. Dr. C. B. Heald is trying to arrange for the formation in New Zealand of an official Rheumatism Council in association with the Empire body, while steps to inaugurate a similar council in Australia are envisaged. The European branch of the International League against Rheumatism are interested in making the council's journal, the *Annals of the Rheumatic Diseases*, the vehicle for their activities; and the American branch of the league are proposing to adopt the *Annals* as their official journal in association with the council.

Turning to research and teaching, Lord Horder said that fourteen "registrars" are now working on the investigation into the factors causing rheumatoid arthritis. The council's laboratory at the Hospital of SS. John and Elizabeth, London, has been reopened, and a research-worker has been appointed to study the allergic aspects of rheumatism. During the past year two successful postgraduate courses have been held. The rheumatism committee formed by the National Coal Board and Miners' Welfare Committee agreed to recommend that the pilot survey into the incidence and causes of rheumatism among miners, suggested by the council, should be undertaken in certain coalfields; and the rheumatism research department of Manchester University will be approached to carry out this work.

Lord Horder was also able to show that the council has used its influence with profit in the field of administration. The Ministry of Food has acceded to a suggestion that extra milk should be allowed to sufferers from active rheumatoid arthritis, and the Ministry of Labour has agreed that chronic arthritic patients should be accepted as eligible for admission to the new reablement centres and "Remploy" factories, on the same terms as those applicable to sufferers from chronic tuberculosis and chronic cardiac disease.

CURRENCY FOR TREATMENT ABROAD

THE Treasury have appointed a committee, known as the Exchange Control Medical Advisory Committee, to advise on cases meriting foreign exchange for treatment abroad. It has been decided that in the present economic situation foreign currency will be granted on health grounds only to applicants who can satisfy the committee that this currency is needed to obtain abroad medical or surgical treatment which offers a reasonable prospect of cure and which cannot be got in either the United Kingdom or the rest of the sterling area (the British Empire except Canada and Newfoundland, Iraq, Transjordan, Iceland, and the Faroe Islands). Previously currency was granted on the presentation of a medical certificate stating that life would be endangered if the patient did not go abroad; but this phrase has proved to be open to loose interpretation.

It is intended that the new rule should be strictly interpreted, and since almost all forms of treatment are to be had in this country it follows that very few applications will be approved. Probably most cases coming under serious consideration will be of tuberculosis, owing to the shortage of tuberculosis beds in this country. The essential consideration will be whether the patient will recover if he is allowed to go abroad for treatment, and it is in consequence thought that such cases as these will qualify: early localised tuberculous infections with definite pulmonary and glandular manifestations; exudative pleurisy after absorption of the fluid; recent fibrosis relatively small in extent; unilateral cavitation; and certain conditions, not necessarily pulmonary, requiring special surgical technique unobtainable in this country. Cases of chronic ill health will not be considered unless there is a good prospect of recovery.

Doctors who think they have suitable cases are asked to send full clinical details, X-ray films, reports of special investigations and of consultants' findings, and an explanation as to why the patient cannot be suitably treated in the sterling area to the secretary of the committee, Tavistock House North, Tavistock Square, London, W.C.1. Normally a consultants' fee of four guineas will be payable. If the committee agree that the case is suitable they will provide a certificate on which the patient's bank will obtain the necessary currency.

HOSPITAL CARE IN THE UNITED STATES

THE report of the Commission on Hospital Care in the United States has now been published.[1] It is the most ambitious attempt yet made in America to blueprint a "coördinated national plan for the future development of the hospital service." The commission, established in 1944 by the American Hospital Association, has conducted an intensive two-year survey of general hospitals in the United States. Voluntary agencies collaborated with the United States Public Health Service, and the present report may therefore be regarded as an authoritative indication of the line that official policy is likely to take. From the first it was recognised that the making of detailed surveys would have to be delegated to the various States, and a great effort has been made to stimulate activity. Michigan led the way, and the staff of the commission undertook the detailed survey in that State as a pilot study, the report of which has already appeared.

The report will go down to history as marking public recognition of the lack of system in hospital organisation in America and the need to remedy it. Some strong phrases are used, reminiscent of much of the public debate in this country which preceded the National Health Service Act: "we refer to our splendid system of hospitals, whereas actually there is none." The current programme of supervision has had a wholesome influence, but it has "not resulted in effective controls." This will not do: "hospitals are now on the threshold of a period of development which will mark the beginning of a new era in the advancement of human welfare." There is a tendency to the platitudinous, perhaps inevitable in a document of this kind. Excellent precepts abound: "general hospitals should coördinate their efforts with those of other community agencies"; "the medical staff should maintain vigilant supervision and continuing evaluation of the quality of medical care in the hospital"; "schools of nursing should be organised on a sound educational basis." But one will search in vain for light upon the fundamental problems which in America as in this country are likely for some time to come to baffle all our best efforts. The report skims lightly over the problem of the shortage of nurses, which is probably even more acute in America than it is here. The reader will find only a reflection of current opinion

1. Hospital Care in the United States: Commission on Hospital Care. New York: Commonwealth Fund. Pp. 631. $4.50. To be published in Britain by Oxford University Press.

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and no real recognition that shortage of nurses is likely to nullify the greater part of the effort now being put into the establishment of optimum ratios of beds to population. The detailed discussion of this subject is based on the use of the "bed-death" ratio to determine the need for hospital beds in a given community. The method, which was used in connexion with the Michigan survey and also in the independent "Master Plan for Hospitals in New York," probably deserves more attention than it has so far received in this country.

In the long historical section the statement that "in the eighteenth century well managed hospitals, organised nursing, and the charitable care of the sick had largely disappeared in Protestant countries" cannot be allowed to pass. It was in the early eighteenth century that the example of the Dutch hospital system, combined with religious motives, led to the foundation of a notable group of hospitals in London (from 1720 onwards), in the English provincial cities (from 1736 onwards), and in Edinburgh (1741). It would be strange indeed if this movement was in no way connected with the foundation of the first voluntary hospital in Philadelphia in 1751 and of the first medical school in 1765. The statement that "European hospitals reached the lowest level of service in history in the eighteenth century" does less than justice to the pioneers to whom American voluntary hospitals today, as well as our own, owe so much.

MENTAL HOSPITALS FROM WITHIN

VISITORS—even medical visitors—to public mental hospitals are often disturbed by the drab and sordid appearance of the buildings and wards, no less than by the disheartened look of the patients. It is usual, on such occasions, to suppose that the patients, lost in the preoccupations of their illness, are unaware of all that strikes the visitor so painfully. Two recently published books dispel this comfortable fancy. *The Kingdom of the Lost*, by J. A. Howard Ogdon,[1] and *Certified*, by H. C. Woodley,[2] are accounts, by men who have been certified patients, of life in two of our public mental hospitals, one Scottish, one English. Both writers—Mr. Woodley outspokenly, Mr. Ogdon in passing—insist on the need for drastic reform; both tell of the added weight imposed on the sick mind by cheerless surroundings—often cold, often dirty—by the company of large numbers of fellow patients, some dirty and degraded, many deeply depressed by their inability to escape from such hateful captivity, and by the insensitive behaviour of the scarce and overworked nursing staff. Far from being unaware of such things, patients suffer mentally because of them, and may even fail to mend because they feel their cause is hopeless. After many years in such surroundings—and residence in mental hospitals is more often measured in years than months—even a healthy mind would suffer. Perhaps the most depressing passages in these books are the accounts, too simple and circumstantial to be disregarded, of the filthy conditions in lavatories and washrooms. In the older mental hospitals sanitary arrangements are barely adequate, but can be made to do if staffing is complete. Nowadays, when mental hospitals are suffering more severely than any other type of hospital from lack of nurses and domestic staff, it is clear that sometimes no pretence of hygiene or even tolerable cleanliness is maintained.

Many other points in which these writers corroborate each other will disturb the complacent. They are agreed, for example, that sedatives were the only form of treatment widely used. Mr. Ogdon says: "I must be quite definite in saying that the average 'public-assisted' patient got no treatment at all for his mental affliction. Only dope was available;" and Mr. Woodley, after a distressing account of the administration of a sedative to a patient who refused to swallow, goes on to say, "So it is with him and with many more: violence—dope, violence—dope, and so on—to the inevitable end." Both tell of uninterested doctors, and of the apathy which succeeds hope—"the deadly boredom of a mind having nothing to 'chew.'"

The implications are clear enough: standards in some of our mental hospitals are now very low, and unless the nursing crisis is handled successfully they are in danger of falling to the level from which such men as Tuke reclaimed them.

1. London: The Bodley Head. 1947. Pp. 256. 10*s.* 6*d.*
2. London: Gollancz. 1947. Pp. 224. 9*s.* 6*d.*

IMMUNISATION AGAINST INFLUENZA

THE background of the recent decision to vaccinate all personnel of the United States Army against influenza[1] was outlined by Prof. Francis G. Blake, of Yale University, in an address last month to the New York Academy of Medicine.

Between Oct. 19 and Dec. 4, 1943, 6263 students in nine universities were vaccinated subcutaneously with 1 ml. of a formolised allantoic fluid eluate, type A and B ten-times concentrated vaccine, made up of the PR8 and Weiss A strains and the Lee B strain of virus; at the same time 6211 controls were injected with comparable material, excluding the virus. Epidemics of influenza A developed in all these institutions in late November or early December. In the whole group the incidence of influenza during the epidemic was 2·22% among the vaccinated, compared with 7·11% in the controls. Resistance, it was found, developed about eight days after vaccination. During the autumn of 1945 the efficacy of this vaccine against influenza B was tested. At one centre the incidence among the vaccinated was 1·15%, compared with 9·91% in the unvaccinated; and at another centre the attack-rate in the vaccinated was 0·5%, compared with 12·5% in the unvaccinated.

Thus, said Professor Blake, considerable success was achieved against both influenza A and influenza B under these conditions: (1) with the use of a potent formolised and concentrated vaccine, in a single dose of 1 ml. subcutaneously and capable of stimulating an antibody response comparable to that which develops early in convalescence; (2) when the antigenic structure of the strains of virus used in the vaccine was closely similar to that of the strains causing the epidemics; and (3) when vaccination had been carried out within 1–6 weeks before the onset of the epidemic.

More recent trials have been less satisfactory. In an epidemic last March, apparently due to virus A with a sharp antigenic deviation from the standard PR8 strain, the vaccine failed to protect persons vaccinated four months previously; and Francis, Salk, and Quilligan attributed this failure to insufficient antigenic crossing between the strains in the vaccine and the prevalent epidemic strain. Similar unsatisfactory results were obtained about the same time among Army personnel and at Yale. Nevertheless, Professor Blake concluded that "it would not appear outside the realms of possibility that the resistance of the population as a whole may be maintained at a level sufficient to forestall and prevent another disastrous pandemic."

1. *Lancet*, Nov. 15, p. 743.

FROM October next women will be admitted to membership of the University of Cambridge on the same terms as men. They will thenceforward take full degrees instead of the title of these degrees, and will be eligible for nearly all university offices, including that of vice-chancellor.

WE have to record the death on Dec. 5 of Dr. R. A. FLEMING, consulting physician to the Edinburgh Royal Infirmary and a former president of the Royal College of Physicians of Edinburgh. He was 85 years of age.

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Special Articles

THE URGENT NEED FOR REFORMS IN HOSPITALS

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IN too many hospitals an essential fact is forgotten—that they were founded not for the benefit of doctors, nurses, or committees of management but to help to restore the patients to health.

Enormous improvement on the social side of hospital treatment is needed. The social treatment of the patient means providing for his comfort, happiness, amusement, occupation, and general welfare, which at present are too often forgotten or relegated to a subordinate position. This social medicine means so much to a patient. It not only helps and accelerates his recovery but also brings it about in a much less irksome manner.

To obtain a satisfactory system of social medicine, at least three things are necessary. First, the medical staff of a hospital must take a great deal more interest and have a much greater say in the matter of hospital management than they have at present. They must see that their patients are sympathetically treated, properly fed, occupied and amused, and made as comfortable and happy as possible. A great deal more than mere medical and surgical directions and treatment is required of them.

Secondly, we need a radical alteration in the way committees of management are elected and carry on their work. We need the members to be selected because of their suitability and their knowledge of hospital routine and procedure. Too often now we have a committee composed of excellent people totally unfitted for their position. They know nothing of hospital management and consider their duties adequately performed if they attend a meeting once a month, sit still and say nothing, and finish by having tea with the matron. They never enter the wards and know nothing of the way patients are fed, nursed, or treated. We need chairmen who are independent and strong, not those content to approve of everything suggested by the matron, having no views of their own, and merely acting as her mouthpiece.

Thirdly, we want a much more sympathetic and understanding nursing service. Nurses should know something at least of psychology, and should recognise that a patient is a human being, living in unhappy and unusual surroundings, who is craving for kindness and sympathy. He must not be merely a case. The matron should hold modern, not antiquated, views, should be trained in human understanding and psychology as well as nursing, and should be of a nature in which sympathy, affection, and kindness are predominant.

In a few, I am afraid a very few, hospitals all these three desiderata are found. We should not be content till all hospitals reach this standard.

VISITS TO PATIENTS

A visit from a friend is often the one event of an otherwise weary day that is most looked forward to. Arrangements for visits to hospitals by friends of the patients vary very much. The up-to-date progressive hospitals allow a daily visit. The backward out-of-date hospitals still keep to Sundays and Wednesdays. There should be no difficulty in arranging visits every day of the week; it is simply a question of ward routine.

If frequent visits are of advantage to adults how much more are they to children separated from their parents and in strange new surroundings, often with very little love or sympathy, and longing for a sight of familiar faces. Two arguments have been advanced against the practice. First, it has been urged that there is a serious risk of infection conveyed by visitors. But infectious diseases, such as scarlet fever and measles, for all practical purposes can be conveyed only by those who have the infection on them, not by those who have merely been in contact with the disease, and naturally those who are actually infectious would not visit the hospital. When infection does take place in a children's ward it is due to the admission in error of a child in the incubation period, not to visitors. In nursing-homes where parents are allowed to visit their children morning, afternoon, and evening those responsible are not obsessed with the bogy of infection, and practice has proved they are justified. Why this differentiation between the two kinds of institutions?

At Worthing Hospital, where for six years daily visits to the children's wards have been permitted, there has been no increase whatever in the incidence of infection. Parents are allowed to visit their children daily and not at a set time to suit the nurses, but at a variable time to suit the mothers, an arrangement which is found to work most satisfactorily and is very helpful to the nurses. Mrs. Jones comes to visit her little Sally, she reads to her an interesting tale. Soon all the ward is listening and interested, enjoying the story. The children are occupied and happy and the nurses are free to carry on their work, temporarily relieved of the care of the children. How ideal this would be if adopted by all children's hospitals.

The doctors responsible for the plastic-surgery clinic in Wellington, New Zealand, have for five years allowed mothers not only to visit the hospital when they wished, subject to reasonable regulations, but also to remain there, going home when necessary. In a plastic-surgery clinic the avoidance of infection is doubly important. Here again results have justified progressive action. No single case of cross-infection has occurred during those five years. The same arrangements have been made in one of the New York children's hospitals, with equally satisfactory results.

At one children's hospital where I tried to get the committee to allow a daily visit I was met with the stereotyped theoretical objections, the grave danger of infection and of psychological trauma. How, in the face of such dangers, the committee could reconcile it with their duty to the children under their care to allow them to run the risks on Wednesdays and Sundays passes my comprehension. For five days the risks must not be run; for two days the committee complacently decided it might. At this hospital there is a notice-board outside inviting any casual passer-by to come in and inspect the hospital. They are allowed in the wards when the mothers of the children are refused. Friends of the staff and committee are constantly taken round. How is it possible to justify these things if the terrible risks of infection really exist?

In a report issued by the British Pædiatric Association on cross-infection in children's wards, among the many precautions advocated there is no suggestion that visits by parents should be forbidden.

The second argument is that visits upset the children and do them harm. But it is found in practice that a daily visit, something to be looked forward to at frequent intervals, is far less upsetting to children than the two-days-a-week plan with its long gaps between. This has been the experience of those hospitals which are sufficiently progressive. The matron uses her discretion where difficult children are concerned. A tactful talk with the mother always ensures coöperation; she keeps away if this is considered advisable.

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The medical officer of a well-known hospital writes me as follows:

"The children's hospital here is an annexe of the Royal Infirmary, and I am in complete charge of the medical ward and oversee the general health of the children in the two surgical wards.

"It is true that in the medical ward there are cubicles and barrier nursing is more strictly enforced; but, on the other hand, there are many more children with infectious conditions admitted.

"I do not remember ever having known a child to be directly infected by visitors. Psychologically the benefits are sometimes enormous and perhaps even life-saving.

"There may be some prejudice to overcome among the senior nurses, but the benefits of visitors soon become so obvious that this is soon dispelled."

It is high time that those hospitals which are behind the times with their procedure and reluctant to put their house in order should be compelled to do their duty to the children in their charge. It is to be hoped that this will happen when the National Health Service Act comes into force and new and up-to-date committees of management are appointed.

OUTPATIENT QUEUES

The long weary waiting in the outpatient department is a real and outstanding grievance. It is remarkable that the long-suffering victims have submitted to it for so long. This waiting period is in many hospitals two or three hours, in some four or five, and in one local hospital even six hours, and then the patients are sometimes sent away and told to come another day. This leads to much resentment.

In many hospitals it is still the practice to summon all patients for the day at the same time. Forty, fifty, or more are crowded in the small waiting-hall, many of them not even able to sit down. The first patient is seen as soon as the doctor arrives, but he has probably been waiting a long time, having come early to obtain a good place in the queue.

This is all wrong. It can be put right by a system of outpatient appointments by which each person is given a fixed time to attend. No extra work falls on the doctor; he sees the same patients, but instead of a great surge at the beginning there is a steady stream throughout the session. The long, weary, unnecessary waiting is reduced from hours to minutes.

The change needs common sense and determination on the part of those responsible. Guy's, the Jewish Hospital, the Birmingham Accident Hospital, the Royal Sussex County Hospital, the New Sussex Hospital, and many others have adopted this procedure to the satisfaction of all concerned.

I recently visited a hospital noted for the long time its outpatients were kept waiting. I had been urging for some years the advantages of an appointment system, with no success.

There were about 70 people crowded into a small waiting-hall. The matron said to me with a triumphant smile: "All by appointment."

I find it difficult to understand how a woman who had reached the important position of matron could imagine that to make appointments for 70 people at the same time was a solution of the problem.

EARLY WAKENING

The time at which patients are wakened for washing varies considerably in different hospitals. In eight hospitals in one area the official time varies between 5 and 7 A.M.; but unfortunately this official time is not always kept and there are plenty of instances in which patients are roused at 3.30 to 4 A.M. This is clearly very bad practice. Rest and sleep are very important to the sick. It is essential that his uneventful and monotonous day should start well, and that he should not be deprived of any of his natural sleep, so important for uninterrupted recovery.

The only reason for this practice of early waking is to allow the nurses to get ready for the doctor's visits. A simple rearrangement of hours of work and of duties, which can be carried out with little difficulty provided those responsible show good will and determination, would put the matter right. The proper time should be about 6.30 or 7 A.M. This is a reasonable hour, which obtains in many hospitals satisfactorily, and there is no reason whatever for waking patients at an earlier hour than this in any institution.

WAITING-LIST FOR OPERATION

Another factor causing patients much anxiety and strain is the long wait between the decision of the surgeon that an operation is necessary and admission to hospital. Many hospitals have a long list of patients awaiting admission, mainly for operation. The chief surgeon of one hospital in the Midlands told me recently that at his hospital the waiting-list often exceeded 1000. In one of our local hospitals a patient was told in July that she needed operation and that her name would be put on the waiting-list and would probably be reached by December. This is no isolated instance. This long period of anxiety is harmful to patients, and in many cases, especially those of cancer, destroys the hope of cure.

The delay is largely due to lack of beds, and the provision of extra beds is an urgent necessity. But until this happy state of affairs comes about something can be done. Other neighbouring hospitals can and will help. The one with no waiting-list and empty beds will help the one with a waiting-list and full beds. Recently a local hospital found itself with 65 patients urgently needing operation. With the willing and friendly assistance of a neighbouring hospital the list was completely cleared in less than a fortnight. Hospital surgeons do not like parting with their patients, nor patients with their surgeons, but the good of the sick person should come before everything.

HOSPITAL DIET

Proper meals mean a great deal to all of us, and something more than a great deal to the sick. By proper meals I mean, first, a meal selected for its nutritional, digestive, and appetising qualities, suitable to the particular patient and given in proper quantities; secondly, a well-cooked meal; and, thirdly, a meal properly served. Meals should not be lukewarm, but hot; the little amenities of the table should be observed; the crockery, glass, and tray cloths should be bright and clean; tea should not be slopped over in the saucer; and attention should be given to the many other small points which go to make a meal attractive and appetising. To carry this out requires good cooks, nurses determined to see that meals are nicely served, and, above all, someone in authority to keep a constant watch on the service of meals throughout the hospital.

Diet is too often inadequate. Neither the patients nor the nurses are supplied with enough food. King Edward's Hospital Fund for London recently investigated the matter in three hospitals in Greater London and found that in two of them the diet was inadequate. The investigators stated that, in spite of recent improvements, hospital diet was not all it should be in quantity and quality, in nutritional standards, and in matters of preparation and service.

The importance of diet is summed up in this quotation from a booklet recently issued by the Ministry of Health:

"Experience has shown that the food provided in many hospitals is unsuitable, badly cooked, and badly served, with the result that the patient's recovery is delayed. Waste, too, is common.

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"It is desirable that some person should be in supreme charge of all the feeding arrangements, including catering, cooking, and service, both for patients and staff. His responsibility must necessarily be delegated to several subordinates, but his control should be real, and not, as in so many hospitals, merely nominal.

"At the same time every medical officer should be taught to realise that he is as much responsible for the proper feeding of the patients under his care as he is for their proper nursing and treatment.

"Suitable meals, well cooked and attractively served, constitute just as important a part of the treatment as careful nursing and skilled medical attention."

ENVOI

In making these suggestions for the improvement of our hospital administration and régime I am advocating nothing new or impracticable. The work done by our hospitals is magnificent, but no-one can say it is perfect, and I am not so foolish as to say that carrying into effect my suggestions would make them perfect. Our first-class hospitals have already adopted these reforms; our second-class have adopted some; our third-class, none. Unfortunately, first-class hospitals are in a very considerable minority.

Each one of these reforms is a step forward, each one for the advantage of the patients and the hospital; and, if they were universally adopted, the recovery of the sick would be pleasanter, happier, quicker, and more complete. There is a wonderful opportunity for the new regional hospital boards. Let us hope they will use it to the full.

AVOIDABLE MENINGITIS

MEMORANDUM FROM THE PUBLIC HEALTH LABORATORY SERVICE AND THE LONDON SECTOR PATHOLOGISTS' COMMITTEE

EVERY operative procedure entails some risk to the patient, but in simple operations like spinal puncture the risk ought to be practically negligible. The occurrence of meningitis following the withdrawal of cerebrospinal fluid or the administration of a spinal anæsthetic is a grave reflection on the methods used in many hospitals, because these "accidents" can be avoided by the adoption of a simple and reliable technique. That such a technique is not in fact universally employed is attested by the number of cases of avoidable meningitis reported in the literature during the past few years. Furthermore, as Garrod (1946) points out, "there is a natural reluctance to publish anything which may appear discreditable. . . . It is therefore probable that meningitis following spinal anæsthesia has been far commoner than the literature of the subject would suggest." This statement is endorsed by surgeons and anæsthetists whenever the subject comes up for discussion.

NATURE AND SOURCES OF INFECTION

This memorandum is not concerned with meningitis secondary to some primary infective focus already present in the patient at the time of operation. It refers solely to meningitis that results from the direct inoculation of micro-organisms into the spinal canal. The organisms most frequently incriminated are *Pseudomonas pyocyanea* and related organisms which can multiply in water at room temperature; less frequently staphylococci and other skin contaminants may be responsible. Some of the water bacteria fail to grow in ordinary culture media incubated at 37°C; hence many cases have been diagnosed as irritative or aseptic meningitis which were probably the result of bacterial infection of the meninges. Organisms normally regarded as non-pathogenic may produce infection if they gain access to the very susceptible meninges.

The *sources* of contamination may be listed as follows: (1) apparatus inefficiently sterilised or contaminated during use; (2) "sterile" water or saline used to rinse the apparatus; (3) hands of operator and assistants; (4) skin of patient; and (5) anæsthetic, antibiotic, or other solutions.

PREVENTIVE MEASURES

The ideal would be to adopt the full aseptic ritual of a surgical operation for every spinal puncture. In many cases the time and place render this impossible. The following recommendations are therefore offered, not necessarily as ideal procedures but as practical methods applicable in nearly all circumstances.

1. *Apparatus.*—If facilities are available, all apparatus including manometer should be enclosed within suitable containers and sterilised either by autoclaving at 15–20 lb. pressure for 20 minutes or by dry heat at 160°C for an hour. The complete outfit can then be held ready for use at any time. If dry heat is used, the rubber tubing of the manometer should be sterilised by boiling. For syringes and needles dry heat is preferable but ordinarily necessitates the use of all-glass syringes. (Glass syringes with metal nozzles which will withstand dry heat at 160°C for two hours are now being manufactured.) Full details of these methods, together with recommendations for a hospital syringe service, are given by the Medical Research Council (1945).

If autoclaving or dry-heat sterilisation cannot be employed, all apparatus should be sterilised immediately before the operation by boiling for five minutes, preferably in distilled water. A steriliser with a perforated lift-up tray should be used; at the end of boiling the tray is removed, placed in the inverted lid, covered with a sterile towel, and left to cool. In the occasional emergency which may arise in the patient's home a perfectly clean saucepan with a lid may be used. After boiling, the water should be drained off and the saucepan left with the lid on until cool. Methods of chemical disinfection such as soaking in spirit should *not* be used.

2. *"Sterile" Water and Saline.*—These probably constitute the greatest source of danger. Hospital supplies are frequently contaminated either from inadequate sterilisation initially or from contamination during previous use (Smith and Smith 1941). Thus the Winchester bottle of "sterile" distilled water or saline, used repeatedly until empty, has frequently been incriminated as the source of water bacteria found in contaminated or infected cerebrospinal fluid. If apparatus is sterilised as recommended above, rinsing and cooling solutions become quite unnecessary and their use should be abandoned.

3. *Hands of Operator.*—The operator should scrub up as for a major operation, or alternatively should don dry sterile surgical gloves. When gloves are not available it is important that his hands be dry before he handles any apparatus; this may be accomplished by rinsing with industrial spirit and/or drying with a sterile towel. Where needle and syringe have to be assembled, the needle should be handled with sterile forceps. From this point onwards the operator should touch nothing except the sterile instruments and the skin of the patient until the operation is finished. The trocar when withdrawn should be laid on a sterile towel; otherwise it may infect the spinal fluid if it is introduced again to clear the needle.

4. *Skin of Patient.*—Thorough washing with soap and warm water followed by thorough, not perfunctory, swabbing with tincture of iodine or 70–90% alcohol will leave little risk of contamination of the needle by the patient's skin. The area treated should be the entire area exposed and the skin should be quite dry before puncture is made.

5. *Anæsthetic and Antibiotic Solutions.*—No cases of meningitis have been traced to the presence of bacteria in anæsthetic solutions contained in sealed glass ampoules. Such ampoules are preferable to rubber-capped bottles intended for repeated use.

The sterilisation of the outer surface of an ampoule is difficult and attended with such pitfalls that it is

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better not to attempt it. The ampoule should be opened, after swabbing the neck with 70% alcohol applied with sterile swabs, by an assistant whose hands have been scrubbed and dried. It may be held in a sterile towel or piece of sterile lint. The operator must then introduce the needle of the syringe into the ampoule without fouling the mouth.

Other forms of container should be avoided except where absolutely necessary. If a rubber-capped bottle has to be used, the cap should be thoroughly swabbed with 70% alcohol or tincture of iodine and held in a sterile towel by the assistant. The bottle should be returned to the central sterilising depot after use each day.

The intrathecal injection of antibiotics such as penicillin and streptomycin demands the same high standard of aseptic technique; and all precautions should be taken to ensure that the solutions themselves are sterile.

REPORTING OF CASES

The general adoption of the measures recommended here would, without doubt, reduce the incidence of "accidental" meningitis but would not close every possible loophole for infection. Further safeguards can be found only if cases are thoroughly investigated as and when they occur and with the employment of specialised bacteriological methods. The Public Health Laboratory Service will willingly coöperate with the hospital pathologist or other officer in carrying out such investigations as are required.

Gratitude is expressed to Sir Hugh Cairns and Prof. Wilson Smith for the help they gave in the preparation of this memorandum.

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HOSPITAL CATERING

A COMPARISON WITH ARRANGEMENTS IN AMERICAN HOSPITALS

MARGARET C. BROATCH

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DESPITE the prevailing shortages many steps have been taken in the last few years by hospitals in this country to modernise their catering arrangements on lines recommended by King Edward's Hospital Fund for London. In some cases a large measure of success has been achieved. The old system whereby a single cooked meal at midday supplemented by simple breakfasts and suppers was considered adequate has been largely discarded, menus have been overhauled, and a much more generous basis including three cooked meals a day has come, in these hospitals, to be regarded as essential to the remedial service. Greater use is being made of the service of dietitians, and capable catering officers are much in demand. Progress is of course hampered by the current conditions, and in some quarters there is a failure to appreciate the distance which our hospitals have yet to travel if they are to offer a service commensurate with their achievements in other directions.

A comparison with the arrangements in American and Canadian hospitals indicates that, apart altogether from the well-planned menus and the variety and abundance of the foodstuffs available which allow for more attractive meals, there are two main directions in which American practice is decisively ahead of ours. In the first place, the visitor from this country is at once struck by the much higher status of the catering service. Catering is invariably entrusted to a dietitian who takes full responsibility for the running of her department financially and for the production and service of meals throughout the hospital, and ranks equally with the superintendent of nurses and other heads of departments. The allocation of staff is on a much more generous scale than has ever been thought necessary or desirable in hospitals over here. The famous New York Hospital, founded in 1771 and rebuilt in the early 1930's, is comparable in size to one of our greater teaching hospitals. It has 720 beds, of which 120 are for private patients and 600 in pavilions (= wards) providing for semi-private and ordinary patients who pay according to their means. Its schedule of staff shows no less than 310 positions on the staff of the catering department, ranging from dietitians, cooks, bakers, and butchers down to tray girls, waitresses, and pantry maids. Such a ratio will strike the reader in austerity Britain as beyond all reason, and indeed this is an extreme example among American hospitals. None the less, many examples could be quoted in this country of the opposite extreme, and it is a fact that in the large majority of our hospitals an upward revision of the staffing schedules of the catering departments is overdue.

MENUS

Nor is the higher standard of feeding that results by any means entirely a matter of money and of supplies. Much more imagination goes into the planning and preparation of menus. The menus throughout are well planned and varied, and three good meals a day are served to all inmates of the hospitals. A point worthy of special note is the abundant use of fruits, fruit juices, salads, and vegetables, of which there is always a choice. The work is more closely supervised by dietitians than is possible in this country, and thus many more unskilled workers are trained within the hospital to become skilled hands and often to hold key positions. In most of the hospitals visited, meals are served to the staff in a pay cafeteria. This system is becoming increasingly popular, since it has been found that a greater choice of food can be given, which leads to less grumbling and more contentment among the staff.

If under the National Health Service our hospitals are to offer food of a range and quality that modern hospital standards require, it will be necessary to see that an ample margin is allowed for an increase in expenditure over and above the levels that prevail today. It is equally important to recognise the need for much more imagination in the planning and supervision of the food service both for patients and for staff. How often a suggested innovation in diet is met by the objection that the patients would not appreciate it! Only recently this answer was given to a suggestion that coffee should be provided, yet many of the present ward population must drink coffee regularly in teashops, canteens, and railway refreshment rooms.

EQUIPMENT

Secondly, the visitor is struck by the wholly different standard that prevails in regard to equipment. Every labour-saving device obtainable is in use not only in the main kitchens but also in the ward kitchens, all of which are equipped with water-boilers, coffee sets, toasters, dish-washing machines, and racks for setting trays. Every patient is provided with a tray, the one most commonly used being made of aluminium with collapsible legs. An outstanding feature in all hospitals is the abundance of stainless steel tables and trucks and of refrigerators. A point of particular interest in the most modern hospitals is the effort which has been made to cut to the minimum the handling of food, and individual dishes are used wherever possible for salads and desserts. Much use is now being made of frozen foods, and in many hospitals deep freeze-chambers are being installed for storage of these. Many of the frozen fruits and vegetables are cheaper and more satisfactory than canned and have superseded them. The high standard of equipment

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generally in American and Canadian hospitals, with its abundance of labour-saving devices, reflects the attention given to the subject by the hospital administration, and it is apparent that in this respect also hospitals in this country have much leeway to make up.

SERVICE OF MEALS

In the items so far discussed American hospital catering is decisively ahead of our own. In one other important matter, however, the arrangements seem to fall far short of ours. In our hospitals the actual service of food to the patients is the responsibility of the nurse. In America the separation of responsibility for catering has meant that in most hospitals the service of the food has been taken out of the hands of the nurse and transferred to staff controlled by the dietitian. The ward kitchens from which the food is served and the staff working them were in every instance in the United States the responsibility of the dietitians, and it was in this in most hospitals that the system appeared to fail. In most hospitals trays are set by "diet aids" and carried by them to the patients from the trolleys. In theory this work is supervised by a dietitian, but in practice there is often no check, and it sometimes appeared that the service of food was careless and the meal unappetising. Where a patient required help in adjustment of pillows or in feeding, the tray was placed on the bedside locker and left until a nurse was available. Quite often there seemed to be a long lapse of time during which the food was cooling, and sometimes, when there was a serious shortage of nurses, the food must have been quite cold. The dietitian cannot be responsible for raising patients in bed or for spoon-feeding the sick. She has not the necessary knowledge of the patient's condition for the first, nor the time nor staff at her disposal to feed the helpless. Moreover the nurse who has no responsibility for the patients' meals often fails to realise the importance of proper nourishment in their treatment. This is increasingly realised to be a serious defect: it not only leads to waste but also in part nullifies the effort which has been put into the preparation of the food.

The point touches most closely the patients in the ordinary wards. Though the service in the numerous grades of private accommodation, which plays such a large part in the American hospital system, may be comparatively satisfactory, the service of the food to the patients in the ordinary wards falls below the standards here. Each patient is provided with a tray, but the crockery is invariably very thick and heavy, the minimum of cutlery is used, and the service—owing to the lack of trained staff and the extent to which the service is entrusted to maids without sufficient supervision—is rough and ready. These observations strongly suggest that, whatever changes are made, it is most desirable to retain the system whereby the nurse is responsible for handing the patient his meals and attending to all those little adjustments which call for individual care and attention.

BURSARS IN HOSPITAL CATERING

How soon, one may ask, is it reasonable to hope that hospitals in this country will be able to overtake arrears? Much help has already been given by King Edward's Hospital Fund for London and its dietetic advisory service, and by the similar service offered by the Ministry of Health. Further progress is hampered not so much by the quantity or quality of the food available as by the lack of skilled personnel, and especially of persons competent to organise the catering service in a large hospital. The work calls for managerial qualities of a high order, for it involves not only the refinements expected in commercial catering but also a practical knowledge of nutritional principles involved in the restoration of the sick to health. An interesting experiment financed by the King's Fund is now going on. A small group of carefully chosen "bursars" in hospital catering are now undergoing training at the London Hospital, and it is to be hoped that in due course as they become available to take up appointments they will powerfully reinforce the efforts of the catering officers already appointed by many hospitals.

CLASSIFICATION OF HOSPITALS

SOME time ago the Essex Hospitals Joint Advisory Council set up a subcommittee to consider the local implications of the report of the surveyors of the hospital services of London and the surrounding area.[1] This has adopted the hospital districts indicated by the surveyors, and it advances its own scheme for the organisation of hospitals within the districts.[2]

Besides linked local or general-practitioner hospitals every district, the subcommittee holds, should have a "district hospital" or "hospital centre," which might in fact consist of more than one hospital; both the linked local hospitals and the district hospital would be under a single management committee. Each district hospital might make provision for general medicine, general surgery (including children), normal maternity, fractures, dermatology, ophthalmology, and ear, nose, and throat work, and to a limited extent for genito-urinary disease, psychiatry, and physiotherapy. Some specialties—for example, abnormal maternity, the more specialised forms of ear, nose, and throat work, pædiatrics, ophthalmology, mental diseases, and orthopædics—could not be fully dealt with in every district hospital; but each hospital should attempt to provide in one or more of these special branches a service available to other districts where that particular service has not been developed, or where the number of beds is insufficient for the demand. Such a service is classified as "subregional."

Provision for routine pathological examinations and for clinical pathology would be made at all district hospitals; but the more specialised pathological examinations would be undertaken at one or more regional laboratories; and the rarer specialties would also, of course, be a regional concern. The subcommittee points out that not all regional services would necessarily be centred on a single hospital; and it is conceivable that a district hospital might offer a regional level of service in a particular specialty. The following classification was adopted by the subcommittee:

District level	*Subregional level*	*Regional level*
General Medicine	General Medicine	Plastic Surgery
General Surgery	General Surgery	Thoracic Surgery
Ear, Nose, and Throat	Ear, Nose, and Throat	Certifiable Mental Disease
Ophthalmology	Ophthalmology	Certifiable Mental Deficiency
Physiotherapy	Physiotherapy	Neurosurgery
Pædiatrics	Pædiatrics	Radiotherapy
Psychiatry	Psychiatry	
Maternity (Normal)	Maternity (Abnormal)	
Genito-urinary	Genito-urinary	
Gynæcology	Gynæcology	
Fractures	Neurology	
Dermatology*	Radiotherapy	
Chronic Sick	Mental Deficiency	
	Orthopædics†	

* Certain skin conditions will require facilities at subregional level.
† Linked both with fractures and with rehabilitation centre and plastic surgery.

1. Hospital Survey: the Hospital Services of London and the Surrounding Area. By A. M. H. Gray and Andrew Topping. H.M. Stationery Office. 1945. See *Lancet*, 1945, 1, 600.
2. Essex Hospitals Joint Advisory Council: Report of Survey Subcommittee. Under the auspices of the Nuffield Provincial Hospitals Trust, 12–13, Mecklenburgh Square, London, W.C.1.

THE Medical Research Council have reconstituted the Dental Research Committee, whose function it is to advise and assist them in the promotion of scientific investigations in this field. The secretary of the committee is Prof. M. A. Rushton, M.D., department of dental medicine, Guy's Hospital, London, S.E.1.

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Reconstruction

NEW YORK'S HEALTH INSURANCE PLAN

Sir RONALD DAVISON

LITTLE has yet been said in this country about the adventure in voluntary health insurance and medical group practice recently begun in New York.

After four years' incubation the Health Insurance Plan of Greater New York, known as H.I.P., emerged as an operative service on March 1 last. In the midst of the war that remarkable man, the late Mayor La Guardia, dreamt of this plan and set up an advisory committee to explore the possibilities of "prepaid medical care" for all families in the middle-income and low-income groups in his vast city and its environs. His dream is now becoming a reality and by the end of this year may cover as many as 100,000 people.

Neither the Federal, State, nor City governments are running this ambitious project. It is based on the private coöperation of the "consumers" of medical services, their employers and unions, and the groups of doctors who contract to provide comprehensive services of a high grade. The city government and the town hall no doubt had a good deal to do with its beginnings—if only because they were the first big employers to join—but it has the status of a voluntary non-profit corporation.

CONTRIBUTIONS

At present H.I.P. does not directly enrol either individuals or families; it will take only groups of not less than 25 people who are associated in their employment—e.g., as members of one firm or of one trade-union. Members can, however, bring in their wives and children on certain conditions. Some sort of income limit seems to be intended, round about $5000, but in contracting for a large group no objection has so far been raised to some 5% of higher-salaried members. This enables executives and even employers to be included.

Yet H.I.P. is by no means a charitable organisation. The premiums are fairly stiff, and the rates cover costs of administration and overheads as well as purely medical charges. Thus the contribution payable for employees comes to about $29 per annum, including hospital service, for a single member, and about $87 for a family of three or more: the employer pays half, and the other half is deducted from wages.

A novel feature of the scheme is that the cost of the large family is spread over the units of one, two, and three persons. Thus the married wage-earner with eleven children pays no more than the married couple with one. Even so the high rates probably deter some low-paid employees from joining the scheme.

BENEFITS

What do the enrolled groups get for their money under H.I.P.?

The subscriber receives a certificate guaranteeing:

General medical, specialist, surgical, and obstetrical care.

Diagnostic and laboratory procedures.

Preventive health examinations and immunisations.

Visiting nurse service at his home.

Ambulance service from his home to hospital.

Some 1500 doctors were enrolled soon after the scheme began and they are voluntarily organised in groups which "combine the integrated service of a first-class clinic with the personalised atmosphere of private medical practice." Each subscriber may choose his own doctor from among the group, and he may also choose his medical group within reasonable limits of area. Advanced tuberculosis and other chronic illnesses requiring institutional care are excluded from the scheme, together with dental service and cosmetic surgery.

H.I.P. benefits do not specifically include hospital treatment, but the Associated Hospital Service already existed for this and has a joint contract with H.I.P. and the city, so that the insured employees of the city should have comprehensive coverage. A similar arrangement exists for the staff of UNO and of H.I.P. itself.

DOCTORS' REMUNERATION

Under the scheme doctors are paid on the capitation system. The open panel plus fee-for-service was rejected as being open to abuse by "patients who tend to shop around demanding unnecessary procedures" and by "doctors who refer patients to specialists unnecessarily."

The size of the doctor's capitation fee was difficult to fix because data for the assessment of "average utilisation" were woefully inadequate. Neither America nor Britain could produce reliable material, and the committee of H.I.P. decided, there and then, that one of their important side-lines would be to keep records of the amount of professional time the care of a cohort of insured people would use in a year. In the end they adopted the following provisional assumptions:

(1) That a group of $12^1/_2$ doctors could meet the needs of 10,000 persons. This team included specialists for all the "heavy" specialties, and about 1400 patients were allocated to each general practitioner.

(2) That this staff could give an average of seven separate physician services per person per year—five office or hospital visits and two home visits.

(3) That a doctor should have a 40-hour working week, with 4 weeks' holiday.

(4) That the average remuneration of a full-time physician in the group should work out at $10,000 a year. A doctor can also have patients outside his H.I.P. quota, provided the needs of the latter are fully met.

In practice it seems that the medical group with a maximum allocation of 10,000 patients receives a gross income of $192,000 a year, of which 35% should be set aside for expenses—such as salaries for auxiliaries, rent, telephone, &c.—leaving $124,000 to be divided among the doctors.

ORGANISATION OF THE GROUP

Each group is self-selected and self-organised, but is expected to be able to offer a comprehensive service; where it is unable to do so, it must procure help from outside and pay for this help from the group income. According to the H.I.P. contract each group is to consist of the equivalent of $12^1/_2$ full-time doctors (to include 7 general practitioners, 1 pædiatrician, and 1 obstetrician-gynæcologist). In the original plan the teams were to operate from medical centres, and though this condition has been relaxed for the present, and doctors may work from their own surgeries, each group has an administrative centre which provides a 24-hour telephone, makes appointments, and keeps the records of the whole team. Some of the groups which are already in being are based on hospitals and medical schools.

H.I.P. has established a medical control board of 15 members to examine the qualifications of doctors who wish to join the scheme and to inspect premises and equipment.

According to the first analyses of the research and statistics section of H.I.P.[1] over 26,000 people had enrolled in May and over 42,000 by mid-June. Doctors gave 6500 consultations in May and over 13,000 in June. General practitioners were responsible for 62% of these, and 30–35% were classified as "preventive."

1. P.E.P. *Planning*, no. 274, p. 163.

THE British Medical Association's Nutrition Committee, set up "to consider and report on the problems of nutrition in this country including present nutritional standards," met on Dec. 1. The members are: Lord Horder (chairman), Dr. G. F. Buchan, Miss Harriette Chick, D.SC., Prof. S. J. Cowell, F.R.C.P., Prof. G. P. Crowden, D.SC., Sir Jack Drummond, D.SC., F.R.S., Dr. R. G. Gordon, Dr. Jean Mackintosh, Prof. V. H. Mottram, M.A., Dr. R. Murray Scott, Dr. R. E. Smith, Dr. H. M. Sinclair, Dr. Donald Stewart, and Dr. J. G. Thwaites; Sir Hugh Lett, Dr. J. B. Miller, Dr. H. Guy Dain, and Dr. J. W. Bone (ex officio). The committee has power to coöpt additional members whose names will be published later, and the Ministry of Health has nominated Dr. H. E. Magee to attend the committee as observer.

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In England Now

A Running Commentary by Peripatetic Correspondents

I WAS first introduced to a simple preventive of seasickness by a patient with whom I was condoling for the loss of an eye. "Well anyway," he said philosophically, "I shall never be seasick again." On my further inquiry, he explained that he used to be the captain of a tramp steamer which took pilgrims to Mecca, and he had observed that one-eyed passengers (a fairly high proportion) were never sick.

I thought I would discuss this novel idea with a higher authority, so I asked an ex-surgeon-rear-admiral (temporary) what he thought. "Of course it's true," he said; and then, lowering his voice, "it was the only thing that enabled me to hold down my job in the war." It appeared that he was ill if he went on the lake in Regent's Park, and it doesn't look well for an admiral to be sick in fine weather. Besides, it's very difficult to vomit with dignity wearing a cap, and it seems that naval officers mustn't take them off on duty. Anyhow when he couldn't escape going on the water (which fortunately was seldom) he developed a nasty stye so that he wore an eye shade, with the happiest results. "To be absolutely sure," he concluded, "stuff cotton-wool into the opposite ear." To my astonished question why, he murmured vaguely, "Oh, you know, semicircular canals and things."

If these personal experiences are confirmed it will be possible to overcome a most distressing malady by the simplest means. Nor is this without a military value. On D-day, instead of fiddling about with hyoscine injections, the invaders could have jumped on the beaches tearing off red eye shades with one hand and pulling out blue ear plugs with the other. Perhaps the Germans would have thought this was the secret weapon at last and would have capitulated without resistance.

* * *

It was in the City of Loving Brothers that I came across a beautiful example of filial and paternal understanding and affection. Both father and son were well-known and skilful surgeons. The father had gained his skill in the harder school of experience, the son had been trained in a world-famous clinic. I was a guest and the son was booked to perform a cholecystectomy. The patient was anæsthetised and the operation-area prepared. The father, dressed up to assist at the operation, was all-attentive but unusually quiet. Suddenly the son, reading his father's thoughts and wishes, said, "I would like my father to do this operation" and moved round to the other side of the patient. The father, obviously gratified, promptly went to work and removed an inflamed gall-bladder and extracted stones from the common duct in a masterly manner.

* * *

I don't suppose many people owe their lives to having V.D.; my bearer does.

News of the disturbances in the Punjab was scanty in Kashmir, and most of the many rumours appeared to be exaggerations. Military personnel were forbidden to travel on trains going through the disturbed area, but I had to get back to Delhi, and so put on mufti at Rawalpindi. All went well until we reached Lahore, just north of the trouble. Here all the Muslims got off the train, which was reduced from nine coaches to two—leaving ample accommodation for the three travellers left—another European, my bearer, and myself. We crossed the Indo-Pakistan border without incident, and then the train was besieged by thousands of non-Muslim refugees. More coaches were added but every seat and every square inch of the floor, running-boards, and roof was occupied by a mass of humanity complete with bundles, bicycles, pots and pans, innumerable children, and all the paraphernalia of the East. As we crawled at 10 miles an hour towards Delhi I breathed a sigh of relief, closed the wooden shutters on the windows, and settled down for a sleep, confident that after all the rumours were exaggerated.

I was woken by banging on the carriage doors, and opening the shutters saw that the train had been stopped in open country by a band of Sikhs armed with swords, home-made spears, and villainous little axes mounted on the end of long bamboo poles. They were searching the train for Muslims, whose fate could not be in doubt.

They swarmed into the compartment, pulled the luggage from under the seats in case someone was hiding there, and showed the greatest interest in my bearer who was lying on the top berth. "Mussalman, Mussalman," they cried and began to drag him from the train. I protested that he was a Christian, and showed them, tattooed on his forearm, a naked lady. They were somewhat sceptical of this being a Christian emblem, and continued to shout "Mussalman." A large crowd had now collected round the carriage and my wretched bearer was trembling with fear. "He's a Christian," I insisted. "If you think he's a Muslim go into the lavatory and see for yourselves. He's not been circumcised." I waited outside, sick at the thought that perhaps he had not told me the truth and that he really was circumcised. The examination seemed interminable, and then came a loud laugh. The Sikhs emerged, grinning from ear to ear. "I don't know, Sahib, whether he's been circumcised or not," said one of them, "but he's certainly got V.D."

My bearer is still in hospital. It's taking a lot of penicillin to cure him, but now that the gross infection has subsided it is clear that he was somewhat inadequately circumcised in childhood.

* * *

A team of industrial psychiatrists had spent several days in an iron and steel works. Their investigations and analyses had gone smoothly except for one puzzling incident in the dispatch department. Here some twenty elderly workmen, each provided with a two-wheeled trolley, carried sacks of nuts and bolts down an incline to the edge of a canal where they tipped their load into a barge. Nineteen of the men pushed their trolley in front of them but the twentieth pulled his behind him, and this required additional manœuvring.

It was clear that this man was less efficient than his mates, but what puzzled the psychiatrists was why he pulled his trolley instead of pushing it. They spent the morning watching Sam, for that was the name of the black sheep, but came to no satisfactory conclusions, and brought the matter up at lunch in the director's dining-room. The works manager treated the whole matter with ridicule; he was a hard-headed Scot and had little time for these new-fangled investigators. Having listened with scorn to a variety of theories he said, "Och, why don't ye ask the mon why he pulls yon trolley and be done wi' it?"

Such horse-sense was irrefutable, and after lunch the party returned to the dispatch bank. The works manager was wasting no time and beckoned to Sam. "Now Sam," he said, "these gentlemen want to know why ye pull yon trolley and nay push it like t'other lads." Sam seemed quite nonplussed by the question and somewhat embarrassed. He stood on one leg and then on the other. He removed his greasy cap and fumbled it in his hands. "I don't rightly know," he replied in a raw Midland accent, "but I reckon it's because I'm sick of the sight of the bloody thing."

* * *

"Don't be worried," I told my wife, "but I've had another bleed from the old ulcer. I haven't been sick or anything yet, but we old chronics get very knowing, and there's one sign that is quite unmistakable after a time or two—the taste of the wind you bring up when you've been bleeding. Sounds rather disgusting; but I didn't want to startle you by vomiting a lot of blood in the night when you weren't prepared for it. If I can have a jerry under the bed and a bath-towel handy I shan't make any mess—in fact I needn't wake you up at all. I shall stay in bed in the morning, of course, but don't let's have any alarm or despondency this time. . . . What did you say? Couldn't it be that underdone liver we had for lunch? Good gracious, perhaps it is."

It was.

* * *

He was an experienced and skilful surgeon but absent-minded, especially when flustered. One day he was to perform a very minor operation which among certain races constitutes a religious rite. Arriving late for the appointment, he was met by the mother holding the victim in her arms. Patting the infant on the head, he said "What a delightful baby!", and then with his best smile, "Is it a boy or a girl?".

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Letters to the Editor

PATHOLOGY IN THE NATIONAL HEALTH SERVICE

SIR,—It would be most helpful if official information could be given about the proposals for developing the pathology service under the new National Health Service.

From several sources unofficial information has lately come to hand that the hospital pathology service is going to be organised separately from the rest of the professional hospital services, apparently along the lines of the E.M.S. pathology services. We do not wish to belittle the great work done by this Emergency Medical Service and those who have worked in it. Nevertheless, justifiable criticisms have been brought against some aspects of it.

Clinicians and pathologists with whom we have discussed this subject, and who have given it thought, are strongly of the opinion that such an arrangement would be a great mistake and not at all conducive to the realisation of the best type of hospital medical practice. We think we are aware of the arguments likely to be put forward in favour of a separate pathology service. There is not one which approaches in importance those against such a service. For the best type of liaison between clinicians and pathologists it is essential for the latter to be an integral part of the hospital's service and staff. It is important that administratively they should be on the same footing as all other hospital medical staff. A full meeting of the members of the Royal College of Physicians on Nov. 27 last agreed to this principle without dissent.

We understand that the development of the new pathology service may already be far advanced in some regions. It is difficult to understand why we were not informed of the new proposals long ago. May we hope for full information quickly, and a realisation on the part of those organising the new service that all pathologists and clinicians are very much concerned with it and should be consulted before any arrangements reach finality?

N. F. COGHILL, Physician.
ARTHUR C. SPENCE, Pathologist.
West Middlesex County Hospital, Isleworth.
D. M. STERN, Obstetrician and Gynæcologist.

THE SYMPTOMS OF CERVICAL-ROOT IRRITATION

SIR,—Dr. Russell Brain and Mr. D. W. C. Northfield, addressing the physical-medicine section of the Royal Society of Medicine on Nov. 12, made a valuable contribution to several branches of medicine by their lucid discussion of cervical-root lesions.

Though the distribution of pain in the areas supplied by cutaneous nerves is well known, it is not adequately appreciated that irritation of cervical nerve-roots will also produce pain over a much greater area and depth, even far removed from the cutaneous nerve-supply, because of sensation carried in the nerves supplying muscles. Irritation of C7 nerve-root causes pain attributed to a small area of skin on the arm, forearm, and hand, and a larger volume of muscles, fasciæ, ligaments, periosteum, and other structures in both the trunk and the limb. Fibres of any of the following muscles may be concerned:

(1) *Via the posterior primary division:* splenius cervicis, semispinales, interspinales, and intertransversales.

(2) *Via the anterior primary division:* scaleni medius and posterior, latissimus dorsi, serratus anterior, pectoralis major, triceps, anconeus, coracobrachialis, extensors of the digits, extensor carpi ulnaris, flexor digitorum sublimis, and (possibly) longus cervicis, and extensores carpi radialis longus et brevis.

Opinions differ among anatomists about the detailed nerve-supply of all these muscles, whose degree of innervation by C7 varies from one muscle to another. Some of these muscles, besides receiving nerve-fibres from C7 and other cervical roots, also acquire thoracic innervation. Further, as Dr. Brain pointed out, additional variations exist in the case of pre- and post-fixed plexuses. Though the details may vary from case to case, the general anatomical arrangement explains why irritation of the posterior root of C7 causes a known area of skin and a wider and less determinate expanse of muscle and other deep structures to become the apparent sites of pain; why damage to the anterior root is followed by wasting which, difficult to assess in any local group of muscles, may be appreciable in the aggregate; and why the symptoms are so widespread and the peripheral signs so few. It is the overlapping of such widely distributed fibres with those from other roots that produces a clinical picture which is confusing if the anatomy is not kept in mind.

Pain in the neck, arm, and trunk is very common. In patients with such pain careful radiography (including oblique views) of the cervical spine often reveals a lesion. There may be only an irregularity of outline of one intervertebral joint, near which one root may have been injured; or a more extensive lesion may be seen. Normal radiograms, on the other hand, do not preclude a local lesion. It has been stated repeatedly that such abnormalities are found in patients presenting no symptoms referable to the cervical spine; but against this I advance the following facts:

(1) The cervical spine is rarely radiographed unless the patient has symptoms.

(2) The symptoms are not correlated with the abnormalities found; perhaps more often than is done at present some of the symptoms are referable on an anatomical basis to the cervical spine.

(3) Instead of such a reference many such syndromes are termed "functional" or "neurotic." Yet no reasonable improvement in the symptoms follows the well-recognised methods of dealing with neurosis.

(4) The pain is usually eased temporarily by analgesics, which are of little value in anxiety states, unless any anxiety which may be present is the result, not the cause, of the symptoms—i.e., relief of the organic symptoms relieves the anxiety.

Therefore our views about what constitutes normality or unrelated radiographic findings should be reconsidered.

In the more severe phases pain in the chest and arm has simulated that of cardiac ischæmia, particularly when an exertion which alters the alignment of the vertebræ is undertaken. The carrying of a heavy bulky object on one side—e.g., a shopping basket—rather than two smaller ones, one in each hand, may necessitate a contralateral flexion of the lumbar and thoracic vertebræ with ipsilateral flexion of the cervical to maintain balance and keep the eyes horizontal. But there are countless other combinations of attitudes and angles between the vertebræ in lifting, carrying, readjusting, and lowering weights. On the whole, cervical-root pain from a skeletal lesion follows the *type* of movement, cardiac angina its *amount*.

Pain at night is experienced through incorrect adjustment or depth of pillows or through rotation and lateral flexion of the neck in sleep. Further, in the state between sleeping and waking the patient may stiffen up, thereby forcibly extending the neck.

Sneezing and coughing both cause jolting. Symptoms may occasionally be prevented by flexing the neck and opening the mouth so that the chin rests on the chest, and raising and adducting the shoulders. This combined action, besides supporting and stabilising the lower part of the neck, helps to relax the rhomboids, levatores scapulæ, and some other muscles attached to the vertebræ. It also allows maximal separation of the bones at the intervertebral foramina, where the nerves might otherwise be compressed by the sudden jolt.

If a definite local obstruction can be demonstrated by myelography, this, together with the signs and other radiographic findings, should make the diagnosis easy. Why, then, is it possible for symptoms to exist without any definite evidence of obstruction? I suggest that many of the features of the common type of lesion—that without evidence of damage to the cord—can be explained by conditions in the intervertebral foramina. Prolapse of the disc allows the approximation of the adjoining vertebræ now supported only by lax muscles and ligaments. Further, the tone of some muscles will be lost owing to damage to their nerve-supply not only

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by disc pressure (where present) but also by damage in the intervertebral foramina by osteophytes and fibrosis. Healing of the original lesion will be by fibrosis, which is partly responsible for the local stiffness, and may be adequate until a sudden jolt, which, stretching the adhesions on which the support depended, allows the bones to override; produces tension on the fibrous tissue in relation to the nerve-roots, which are further damaged by osteophytes in the foramina; and causes an acute wry-neck and possibly thereby local damage to the cord.

The reason why so common a lesion of the nerve-roots is so often not recognised is that osteophytes and fibrosis in the intervertebral foramina may affect the larger posterior roots more than the smaller anterior roots, and the greater the damage to the posterior roots the sooner the symptoms, though possibly severer at first, will subside through death of the sensory fibres affected. Repeated irritation of these roots will show widespread symptoms but few signs. The greater the damage the poorer the muscle tone. The loss of pain after manipulation—a dangerous procedure—may, on occasion, be explained by sudden death of the sensory fibres. The patient is not concerned with any further hypotonia, which may be compensated for by his ability to exercise other and unaffected muscle-fibres without restriction by pain. In the case of the anterior roots, when only a part of the root is injured, a variable number of fibres waste; but the loss of muscle tissue is shared by so many muscles that the wasting is difficult to assess. Hence the recorded findings may be somewhat as follows:

The patient may be described as of poor muscular development, with postural scoliosis.

The triceps-jerk is weak. At most some hypo-algesia at the end of the thumb and index, and possibly of the middle, finger may be mentioned.

No local wasting is discovered.

The condition is diagnosed as "fibrositis," "myositis," or "functional"—that increasingly threadbare "line" in the art of medical "strategy"—or the scoliosis, termed "postural," is considered to be the origin of the symptoms, whereas it may have developed as a secondary manifestation of the lesion. Where the scoliosis is primary it will be aggravated by stretching of the nerve-roots by permanently abnormally situated vertebræ. Scoliosis is to be expected when, in a lesion of the C7 root, some hypotonia and wasting affect a variable number of fibres in the muscles supplied by the posterior primary division and in the scaleni, serratus anterior, and latissimus dorsi muscles.

Though some of the effects of a lesion of the C7 root have been tentatively described, other cervical or thoracic roots may be involved, either alone or together with C7. The clinical picture, if more than one root is affected, will appear more complex than the one outlined above.

A more frequent recourse to the principles of anatomy would improve our approach to clinical medicine. It would ensure the utilisation of many proven facts and might prevent many a new idea in medicine from becoming a questionable advance in uncertain terrain.

To those "interested in" eponymous syndromes, I suggest that a little more thought to von Bechterew, now aided by modern radiography, might reap its rich rewards. The recognition of trauma to intervertebral discs has shown us some defects in our knowledge and attitude—*discis discissis discimus*.

London, N.4. I. H. MILNER.

HORMONE TREATMENT BY IMPLANTING PELLETS

SIR,—I was interested in Dr. Simpson's letter (Nov. 29), in which he reported the use of testosterone in Simmonds's disease in women, and observed extrusion of the pellets from the site of implantation. I have implanted testosterone in several cases of Simmonds's disease due to postpartum necrosis of the anterior pituitary. In no case have the pellets been extruded, and all the patients have experienced improvement in their physical strength.

Liverpool. V. K. SUMMERS.

CHILBLAINS

SIR,—In your annotation of Nov. 29 you referred to the fact that chilblains are almost unknown in America. I can confirm this from my own experience. I suffer moderately from this condition every winter, but when I spent two years in New England I was completely free, although one winter was very severe with considerable spells of sub-zero temperatures.

I am sure that chilblain sufferers in this country would benefit from better-heated houses as you suggest, but I believe this would be the result not so much of *warmer* as of *drier* surroundings. Chilblains, in my view, occur in damp chilly conditions rather than in really cold weather. Personally, I suffered less than usual last winter in spite of very inadequate heating. Temperatures between 30° and 39°F with wet or foggy weather are the worst. When the temperature drops sufficiently below freezing-point, with hard frost or dry snow, there is insufficient moisture to produce the condition.

I have no particular theories as to how dampness is concerned in the production of chilblains. Probably it prolongs the state of chill, since it requires more body heat to warm up socks, shoes, and gloves if they are damp and cold than if they are dry and cold. Dry snow can be readily kicked or shaken off boots and gloves, while wet snow cannot. I believe that the freedom from this complaint in America is due chiefly to their dry winter climate, assisted by properly heated houses and perhaps also by abundant sunshine.

I should be interested to know if your readers confirm my experience of comparative freedom last winter.

London, N.W.3. ROSEMARY PRITCHARD.

TUBOCURARINE IN TETANUS

SIR,—The letter of Dr. Gordon Sears (Nov. 29) describing a case of tetanus treated with tubocurarine prompts me to report briefly two cases which have occurred in this district this year.

CASE 1.—A girl of 9 years had pierced her finger with a thorn. Symptoms were severe from their onset some days later, and the child was very ill when admitted to hospital. The treatment followed the usual lines in regard to serum, penicillin, administration of fluid and paraldehyde; and tubocurarine was given in doses of 5 mg. at the start. The spasms, which were very severe and occurred at about 1-minute intervals, were decreased in severity but not in frequency by the curare. I suggested that a more suitable drug might be 'Myanesin,' on the grounds that it had a less depressing effect upon respiration, and that its seat of action was thought to be at the spinal-reflex level. Doses of 0·5 g. were given, increased to 0·75 g. and then to 1 g., intramuscularly at intervals of 2 to 4 hours. The decrease in severity of the spasms was found to be more pronounced than after curare, though again there was no lessening of frequency; the child was, however, able to sleep through many of the spasms. She appeared to be holding her own, but she died quite suddenly from acute respiratory arrest during a spasm.

CASE 2.—Only a few weeks later a gipsy boy, aged 10, was admitted ten days after sustaining extensive and dirty superficial abrasions of the arm and leg on a piece of glass (he said) on the bank of a stream in which he was fishing. He had severe trismus, and this rapidly extended to the limbs and back; the intervals between spasms varied from 1 to 20 minutes, usually about 5. Fluid, penicillin, serum, and paraldehyde were given, but this time myanesin was used in 1 g. doses from the start, intramuscularly and at intervals of $1^1/_2$ or 2 hours. The spasms were very well damped down, and their frequency slowly but steadily lessened. During the first five days from the commencement of treatment 15–18 g. was given daily in this way—a total of 78 g. in 120 hours. There was no depression of respiration, and no ill effects at the sites of injection, but it was erroneously thought at this stage—mainly owing to a mistaken report on a blood-urea estimation and a diminishing urinary output—that renal failure was impending, and the myanesin was discontinued. The spasms at once became much worse, and the child's condition desperate. 'Avertin' was then substituted for paraldehyde per rectum, with excellent effect; an initial dose of 3 g. (estimated body-weight $4^1/_2$ stone) was given, followed by 1 g. doses at lengthening intervals over the next three days until a total of 16 g. had been reached. By this

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time, eight days after the beginning of treatment, the child was well on the way to recovery, which was eventually complete in all respects.

The experience of these two cases suggests that perhaps the most hopeful line of treatment may be a combination of myanesin and avertin. It seems doubtful whether curare could safely be given in sufficient dosage over a considerable period to control a bad case, and in the first of these children the effect of myanesin was definitely superior to that of tubocurarine. There was no clinical evidence in the second case, in spite of the enormous dosage, of the hæmolysis which has recently been described as a contra-indication to the use of myanesin. In any event, the desperate nature of such cases as these justifies the use of any drug offering hope of benefit, even if it must be pressed beyond the point of theoretical safety.

Both these children were under the care of Dr. Charles Pinckney, who kindly allowed me to coöperate in the treatment.

Windsor. D. H. BELFRAGE.

DETERMINATION OF HÆMOGLOBIN

SIR,—Through the sustained interest of Prof. E. J. King and his colleagues, the Haldane method for hæmoglobinometry has probably been subjected to more careful scrutiny than any other technique now in common use in clinical biochemistry. Unfortunately, this critical analysis of its sources of error has led to a widespread impression that the method is an unsatisfactory one and could with advantage be replaced by others of more recent development. In the main, the criticisms of the Haldane method have centred about two points: firstly, the absolute value and stability of the standard; and secondly, the accuracy of the final colour matching.

The well-known colour standard originally introduced by Haldane was a carboxylated 1% solution of ox blood, which, in accordance with the blood-gas analysis method then in use, liberated 18·5 ml. of oxygen per 100 ml.[1] It may here be noted that although Hüfner had already obtained his coefficient for the volume of oxygen that combined with 1 g. hæmoglobin, Haldane specifically rejected any attempt to express the hæmoglobin concentration in terms of grammes per 100 ml. More recently, a fresh standard has been proposed and defined in the British Standards Institution specification no. 1079. This new standard is no longer based upon the oxygen capacity of the blood from which it was prepared, but upon the colour of the final comparator tube expressed in terms of the international trichromatic colour scale. This standard agrees remarkably closely with Haldane's original one; in the specification it is stated that it was prepared from a specimen of blood which liberated 18·5 ml. of oxygen with the Haldane blood-gas apparatus, and hence, by the application of Hüfner's coefficient, contained about 13·8 g. hæmoglobin per 100 ml.[2] This actual value, however, was not regarded as part of the definition, but if necessary to be modified in the light of further work.

This work has now been carried out by Professor King and his colleagues,[3] but instead of using Haldane's method for blood-gas analysis they employed that devised by Van Slyke. These two methods, the former depending solely upon the action of potassium ferricyanide upon the blood and the latter upon the double action of this chemical and exposure to greatly reduced pressure, are well known to have a systematic difference, which has been estimated by several investigators to lie between 2 and 6%. The difference between the hæmoglobin content of 14·4 g., corresponding to the 100% on the Haldane colour scale, as determined by King and his colleagues, and the 13·8 g. as estimated for the B.S.I. subcommittee for the standardisation of the Haldane hæmoglobinometer, thus largely, if not wholly, arises from the differences in the gas-analysis methods used. Whenever the hæmoglobinometer standard is expressed in terms of oxygen capacity (or of hæmoglobin concentration), the gasometric method used must be stated if the significance of the figures is to be correctly appreciated.

The second criticism of the Haldane hæmoglobinometry method—that of the difficulty in matching the standard and the unknown—has been largely based upon the test carried out by Macfarlane[4] for the M.R.C. committee on hæmoglobin surveys. There are several features of this test which must be taken into consideration before its significance can be properly assessed.

Firstly, the observers under trial were provided with hæmolysed blood, the accurate pipetting of which presents greater difficulties than does that of unlaked blood; unless care is taken some of the dissolved hæmoglobin adheres to the side of the narrow pipette and the subsequent estimations are spuriously low in consequence. Secondly, in the original description of his method, Haldane directed how the matching was to be made. He stated: "Water was now cautiously added from the burette until the tints of the solutions in the two test tubes became equal. The points at which there was just too little, and just too much water were noted, and the mean taken as the correct result." And again: "During the comparison the two tubes were repeatedly transposed, as unless this was done very appreciable errors were possible, particularly with light from a window." Unfortunately, in Macfarlane's series only 5 of 56 observers took both these simple precautions, the importance of which he himself emphasises in his subsequent careful analysis of the sources of error in the Haldane method.

Before discarding the Haldane hæmoglobinometry method for general use in clinical laboratories, pathologists should give careful consideration to its many advantages. The standard can be carefully calibrated at the National Physical Laboratory, both at the time of manufacture and at any time in its period of use. Modern carboxyhæmoglobin standards, as King and his colleagues have now found, are stable for a period of several years at least. The fine glass-ware required can all be calibrated accurately at the National Physical Laboratory and any needed corrections applied. In contrast to photo-electric methods, the Haldane test is little affected by slight turbidity in the final solution. Any unusual hæmoglobin derivatives, such as methæmoglobin following sulphonamide therapy, can often be detected by their unusual tints—a point that would necessarily escape attention should a hæmatin method be used. Finally, the numerical results obtained by the method, if correctly employed, are readily transferable from one hospital to another. It seems a pity that a method which is simple, and has so many advantages, should fall into disrepute largely because of persistent disregard of certain essential precautions to which its author specifically drew attention.

Professor King and his colleagues have made a valuable contribution to hæmoglobinometry, not least because they have gone far towards resolving the differences between British and American hæmoglobin values which have for long perplexed hæmatologists in this country. It seems clear too that their findings demonstrate that the value of 14·4 g. of hæmoglobin per 100 ml. may now be accepted as the closest Van Slyke gasometric equivalent, just as 13·8 g. is the closest Haldane gasometric equivalent, of the colour standard defined by the B.S.I. specification.

Department of Pathology, Guy's Hospital Medical School, S.E.1. G. PAYLING WRIGHT.

SYMPTOMS DUE TO MECKEL'S DIVERTICULUM

SIR,—Mr. Selwyn Taylor rightly points out that chronic symptoms due to Meckel's diverticulum are rarely recognised.

I recently had a case of acute intestinal obstruction due to a band, one end of which was drawn out from a very large "Meckel," while the other appeared to be a fairly recent adventitious attachment to neighbouring meso-ileum. This patient, a man of 42, had consulted me on several occasions in the previous two years complaining of very intense, usually nocturnal, bursting pain in the lower abdomen and front of the rectum. He could not relate these attacks to anything, and said that they had been present for over ten years, though sometimes at intervals of many months. Rectal and genito-urinary investigation had revealed no abnormality.

Since resection of the Meckel's diverticulum last February he has had no symptoms.

Chippenham, Cambs. JOHN ROWLANDS.

1. Haldane, J. S. *J. Physiol.* 1901, **25**, 331.
2. Donaldson, R., Harding, H. G. W., Wright, G. P. *J. Path. Bact.* 1943, **55**, 205.
3. King, E. J., et al. *Lancet*, Nov. 29, p. 789.
4. Macfarlane, R. G. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 252, 1945, p. 59.

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OUR HOSPITALS

SIR,—The leading article in your issue of Nov. 15 refers to many of the important points stressed by Dr. C. T. Maitland in his recent Chadwick lecture, in which he said much to stimulate a fresh conception of the use of hospitals in the future.

Traditionally hospitals have been spoken of in terms of the number of beds contained in them, and it has been customary to use the word "ancillary" when referring to the special facilities afforded by them for (1) investigation and (2) treatment. These facilities comprise all such "ancillary" accommodation as (1) X-ray and electrocardiographic departments, and pathological laboratories; and (2) operating-theatres, and the department of physical medicine and rehabilitation with its occupational-therapy centre. Hitherto large general hospitals (other than teaching hospitals) have provided two distinct types of service. On the one hand they have acted as diagnostic and therapeutic centres; on the other hand, to this purely medical function has been added the discharge of a social duty in providing shelter, care, and maintenance to patients who have gained admission to them. The approach to future hospital problems has been greatly helped by Dr. Maitland's transfer of the emphasis from beds to the outpatient department. For the medical criterion by which hospitals should be compared is the extent of facilities for diagnosis and treatment available to their specialist clinicians; and these facilities are not dependent on the number of inpatient beds provided. If in future (as Dr. Maitland suggested) the outpatient polyclinic, equipped with plant adequate for all the needs of its consultants, is regarded as the focal point of the hospital, then the inpatient beds are ancillary to this and for use only by such patients as cannot receive proper investigation and treatment as outpatients or elsewhere in the beds of some less expensively equipped building.

Surely this viewpoint has a further rider of great practical importance to the solution of the grave nursing shortage. It is stated that an additional 22,000 trained nurses would be needed to implement the recommendations set out in the Working Party's report. Though this large number may not be fully obtainable, the impasse could be overcome if there were a proportional diminution in the number of inpatients to be nursed by them. Does not this lead to two conclusions: (1) while the Working Party's proposed radical changes were being effected, the majority of trained nurses would be needed for such patients as were undergoing investigation and active treatment; and (2) therefore it follows that during this interregnum other long-stay patients requiring maintenance might have to be cared for elsewhere by non-nurses working under skilled nursing supervision.

St. Helier County Hospital, Carshalton. E. B. BROOKE.

THE CHRONIC PARETIC

SIR,—In his article (Nov. 22) Dr. Kirman stated that "chronic paretics do not represent a heavy burden on the community and should become much fewer with the routine use of lumbar puncture by venereologists, followed where necessary by prophylactic fever treatment or suitable chemotherapy." Dr. Atkin in his letter (Nov. 29) lays stress on the fact that "the attainment of negative reactions by no means guarantees a cure."

It is essential to distinguish between clinical and serological results. The former are directly dependent on the degree of irreparable cortical damage. Consequently, if organic degeneration has set in before treatment, complete clinical recovery is impossible, although the disease process may be arrested. On the other hand, the condition of the cerebrospinal fluid is a reflection of the invasion of the central nervous system by the spirochæte. Of cases treated at Horton, 85% develop completely negative fluids, showing that malaria plus chemotherapy is an efficient spirochæticidal agent. The discrepancy between the clinical and serological outcome is due to the lack of regeneration of the damaged central nervous system despite the destruction of the invading organism. Blood-serum reactions become negative eventually in many cases, but the all-important test is the reaction of the cerebrospinal fluid.

The problem of the chronic paretic cannot be ignored. The number in our mental hospitals will never be adequately reduced until the diagnosis is made in the earliest, and preferably the latent, stage of the disease, and appropriate treatment is immediately initiated, either with the hope of cure or as a prophylactic measure against the subsequent development of an incapacitating form of mental disorder.

Malaria Therapy Centre, Horton Emergency Hospital, Epsom. W. D. NICOL.

AMBULANCES

SIR,—Your leading article of Nov. 29 remarks that for ambulance purposes, "presumably borough and county boundaries will disappear" in the National Health Service. Actually, however, they will not disappear. Under the Act the duty of providing an ambulance service is laid upon the local health authority—i.e., the county-borough council or county council—which will have the duty of supplying an ambulance in answer to a call originating within its own area whether the patient has to be taken to a place in or outside that area. Of course, the Ministry recommends the closest coöperation between neighbouring local authorities; but, legally, county-borough and county boundaries will remain. When you say that "the county health authorities . . . are to bear the whole burden in the future" it should be understood that you are including the county boroughs under this heading. And the service will be definitely (not "presumably") free of charge.

Health Department, Leicester. E. K. MACDONALD.

*** From the standpoint of the patient, which was chiefly in our minds, the boundaries—hitherto very real—will disappear. Our correspondent is right in pointing out that the administrative responsibility for picking up the patient will still be limited by county and county-borough boundaries.—ED. L.

BORNHOLM DISEASE

SIR,—The article by Major Hamburger and Major McNeil (Nov. 29) interested me considerably as I saw several cases of Bornholm disease during an outbreak in May and June, 1946.

This occurred among British troops and auxiliary services stationed at Naples. I can confirm that before an epidemic is recognised cases are apt to be mistaken for acute abdominal emergencies, the sudden onset, severe pain, and rigidity suggesting a perforated gastric ulcer or acute appendicitis. Some of the patients, however, complained also of pain in the shoulder, and this gave one a clue that the diaphragm was involved; but I noticed that none of the patients in the series reviewed by Hamburger and McNeil had this symptom. Once the nature of the epidemic was realised, diagnosis was made without difficulty, and one could confidently assure the anxious patient that the pain would be gone in 24–48 hours. Only a minority relapsed after the initial pain had disappeared. Cases of benign lymphocytic meningitis were seen at the same time, but such cases occurred among troops in other districts where no epidemic of Bornholm disease prevailed.

Lambeth Hospital, London, S.E.11. A. L. WYMAN.

TREATMENT OF BOILS

SIR,—The prevalence of boils and carbuncles in general practice, which was noted by Dr. Gottlieb in your issue of Nov. 29, will surely be confirmed by most general practitioners. I noted a similar increased incidence in the autumn of last year. May I suggest that the reason is the combination of lessened blood-supply and increased humidity of the skin, due to the damp cold air of autumn? Pathogenic staphylococci are ever present on the human skin, awaiting an opportunity to pierce the body's defences.

The general practitioner, in applying penicillin treatment, has to follow the dosage schemes issued by various research-workers. Of late one has been somewhat bewildered by rapidly changing opinions on this subject. For boils, carbuncles, and septic fingers, I have used 100,000 units twice daily, then 200,000 units once daily, and finally 500,000 units once daily. With all these dosages seemingly complete cures have been obtained. One of my patients, a girl of 17, with furunculosis of the knee, relapsed after a 3-day course as a hospital outpatient, and again after a 7-day course. On both of these

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occasions the knee had cleared up completely. I did not attempt a third course, but have used staphylococcal vaccine, with seccuss. In using sulphathiazole, I have been disappointed several times after prescribing 20 g. in 3 days for patients with boils.

In considering the reasons for failure or relapse with penicillin or sulphonamide treatment, adequacy of dosage and proper spacing of injections are of course important. (From the general practitioner's point of view it would be a great help if single daily doses of aqueous penicillin were sanctioned by the pundits.) But it may be that staphylococci in poorly vascularised regions—and especially on the skin—get only enough contact with penicillin to enable them to develop a resistance. Instead of relying on penicillin alone for controlling boils, &c., we should perhaps return to broader lines of treatment, such as the use of vaccines, skin sterilisation, and reduction of carbohydrates in diet.

Dr. Mary Barber, writing in the *British Medical Journal* of Nov. 29, described penicillin-resistant strains of staphylococci which may or may not have acquired the resistance after penicillin treatment. Where resistant organisms occur and clinical response is unsatisfactory, dosage and spacing must be revised. In any case, vaccines prepared from penicillin-resistant strains might be of help in the treatment of recurrent infections.

Hornchurch, Essex. I. H. J. BOURNE.

ADVISERS TO THE BOARDS

SIR,—Your leading article of Dec. 6 is certainly timely, as the development of a full-time professional bureaucracy in each region would be most regrettable.

Perhaps the situation as regards psychiatry has arisen following the relative neglect of this subject by the universities. Thus, in London there are professors of medicine, surgery, and pathology at all the teaching hospitals, but only one professor of psychiatry for the whole territory, with two additional professors in the provinces. Scotland, as is not unusual, appears to be better served in this connexion.

If the community can afford a full-time "top-grade" psychiatrist in each region, surely this individual should be a professor of psychiatry at the main teaching hospital, whence his services would be available to coöperate with the regional medical advisory committees advocated in your leading article, rather than another administrator divorced from medical teaching and research.

Horsham, Sussex. T. M. LING.

Public Health

Poliomyelitis and Polioencephalitis

THE more rapid decline in notifications mentioned last week has been maintained. In the week ended Nov. 29 notifications of poliomyelitis were 103 (142) and of polioencephalitis 3 (3). Figures in parentheses are those for the week ended Nov. 22. It has been suggested that in epidemics original notifications overstate incidence. This is confirmed by the following figures for poliomyelitis supplied by the General Register Office:

Quarter	Notifications	
	Original	*Corrected*
June	268 ..	244
September	6192 ..	5077

Infectious Disease in England and Wales

WEEK ENDED NOV. 29

Notifications.—Smallpox, 0; scarlet fever, 1765; whooping-cough, 1513; diphtheria, 216; paratyphoid, 18; typhoid, 8; measles (excluding rubella), 2772; pneumonia (primary or influenzal), 567; cerebrospinal fever, 44; poliomyelitis, 103; polioencephalitis, 3; encephalitis lethargica, 0; dysentery, 77; puerperal pyrexia, 134; ophthalmia neonatorum, 51. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from whooping-cough, 1 (0) from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 3 (0) from diphtheria, 61 (4) from diarrhœa and enteritis under two years, and 18 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 189 (corresponding to a rate of 23 per thousand total births), including 27 in London.

Parliament

FROM THE PRESS GALLERY

Purchase-tax on Drugs

DURING the committee stage of the Finance Bill in the House of Commons on Dec. 2, Mr. SELWYN LLOYD moved an amendment to clause 5 to exclude manufactured or prepared drugs and medicines from the increase in purchase-tax. He said that at the moment drugs and medicines were subject to a tax of a sixth, which was now to become a third, of the wholesale value of the goods. Was it not rather sadistic that the Government should double the tax on such simple remedies as iodine, quinine, and the simple forms of nerve tonic? Almost all the ingredients of the common cough mixtures, certain of the drugs for relieving pain, and many of the simpler medicines would be subject to the increased tax. 'Vaseline' bought in a 4 oz. tin was free of tax, but in smaller quantities it was not. This imposition constituted an additional tax on sickness and on things which might prevent minor ailments from becoming more serious. If the result was to turn minor ailments into hospital cases it might easily defeat its purpose. The Government themselves were large purchasers of drugs, he continued, and the financial aspect could not therefore be important.

Sir HENRY MORRIS-JONES had never understood why drugs and medicines were subject to purchase-tax at all. In the overwhelming majority of cases they were a necessity. He urged that special consideration should be given to drugs which were preventives and sedatives.

Mr. F. J. ERROLL held the tax discriminated unfairly between different types of diseases, and added to the difficulties of the chronic sick and the aged and infirm. While there was an amazing list of drugs and medicines on which the new tax was to be levied, there were notable exemptions such as penicillin, the sulphonamide group, vaccines, and morphine. Thus we taxed the cure of toxic goitre and malaria, but left the cure of pneumonia and gonorrhœa free. There was the further point that the dispensing practitioner, particularly when he was a panel doctor, received a fixed rate for the medicines he supplied, and any increase in the purchase-tax on the ingredients must be entirely borne by him.

Mr. H. LINSTEAD, in supporting the amendment, asked the Chancellor of the Exchequer to have a look at the whole operation of the purchase-tax as it affected medicine. When this matter was last discussed the then chancellor indicated that he could not afford the loss of revenue—something like £9 million—which the remission of the tax would entail. But it was no longer a case of balancing the budget but of curtailing expenditure on non-essentials. Nobody could maintain that drugs were non-essentials, but the Chancellor might have a good deal of sympathy if he imposed additional taxation on patent medicines.

Sir STAFFORD CRIPPS said that for some time discussions had been going on with the Ministry of Health on the question of getting the list of drugs in the exemption order extended and put on a sounder basis. He agreed that its present basis did not seem to be wholly logical. Before next April he hoped it would be re-examined with a view to excluding drugs which were of real importance. He would remind the House that prescribed medicines did not attract the tax, though some drugs in the medicine might be taxed, but looking at the proportion of the drugs and the cost, compared to the final article, it was clear that the incidence was not heavy. Most of the receipts from this tax were a substitution for the old stamp duty on patent medicines. He could not believe that the taking of patent medicines without the advice of a doctor was a good way of dealing with the health of the population. While he could not accept the amendment he proposed to look into the matter before next April to see whether a more logical system of exemptions could be devised. They would be much helped by the fact that the new National Health Service Act would be coming into operation, and they would have the assistance of the Ministry of Health, who would be large users of drugs in the hospitals and elsewhere.

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Mr. LINSTEAD pointed out that, apart from medicines prescribed under the National Health Insurance Act, half the medicines prescribed today were proprietary medicines and would attract the 33⅓% tax. The old medicine stamp duty, he added, did not apply to medicines sent to the chemist to be sent out with a medical prescription.

The amendment was negatived by 278 votes to 131.

Medical Practitioners and Pharmacists Bill

This Bill, which has already passed through all its stages in the House of Lords, was given a second reading in the House of Commons on Dec. 5. Mr. BEVAN in proposing the motion stressed the necessity of getting the Bill passed into law by the end of the year, for doctors on the temporary register would otherwise be unable to continue to practise after Dec. 31. When the temporary register closed there would be, he thought, about 3500 such doctors, but it was estimated that only 1500 to 2000 would wish to remain. There would also be a further 200 Polish doctors brought here under the Polish Resettlement Scheme. Mr. Bevan admitted that the closing date, arbitrarily fixed as Aug. 4, might give rise to cases of individual hardship, but it could not be avoided. In the committee stage he would introduce an amendment to enable doctors attached to our establishments abroad to practise in this country.

Mr. WALTER ELLIOT welcomed the Bill as a measure of relaxation instead of restriction, and promised that the Opposition would afford every facility to secure its speedy passage into law. Mr. SOMERVILLE HASTINGS also welcomed the Bill, which, he added, it was an open secret, had arisen at the suggestion of the doctors themselves. He was uneasy about clause 8 which permitted foreign postgraduate students to undertake medical work in our hospitals. He suggested that the words "demonstration and instruction" should be substituted for "employment," and that such appointments should be limited to teaching hospitals where supervision was more complete.

Colonel M. STODDART-SCOTT said it appeared that the General Medical Council would undertake some sort of screening, and would decide from whom registration should be withheld. Would this decision, he asked, be made purely upon medical qualifications or service, or in what way? He welcomed the provision allowing the doctor right of appeal to the Privy Council from a G.M.C. decision. A British doctor under the National Health Service Act would not have the same privilege. Sir HENRY MORRIS-JONES suggested that there should be some form of examination, as well as a probationary period, before the new entrants were admitted.

Mr. H. LINSTEAD regretted that it had not been possible for the medical profession to do as the pharmaceutical profession had done, and omit the proviso of the closing date.

Mr. BEVAN in his reply said he was an enthusiast for providing postgraduate facilities in this country for students from abroad. It was a grief to him that students from the Colonies sometimes went elsewhere because we had not facilities for them in London. Therefore he deprecated Mr. Hastings's cold douche on the Bill's provision for the registration of these students. The Bill was only regularising a practice which already existed, and, as the students would be in hospital under supervision, the patients would be protected. The right of appeal to the Privy Council given in this Bill was not inconsistent with his views on the National Health Service. Here it was a question of professional qualifications—an entirely different matter from whether a person was giving suitable service or not. It was impossible for him to reconsider the closing date, for the Bill was an agreed measure, and it would be a breach of faith.

QUESTION TIME

Doctors in the Services

Replying to questions, the Services Ministers stated that the present ratio of medical officers to the total strength of the Navy is 3·25 per 1000; of the Army 3·5 per 1000; of the R.A.F. 3·1 per 1000.

Number of Medical and Dental Students

In reply to a question, Sir STAFFORD CRIPPS stated that the numbers of full-time medical (including dental) students attending university institutions in Great Britain were as follows:

—	Men	Women	Total
Autumn term, 1947	12,389	3175	15,564
Academic year, 1938–39 ..	11,623	2013	13,636

Calorie Value of Potatoes

Mr. HENRY STRAUSS asked the Minister of Food what calorie value per oz. of potatoes he had assumed in estimating the loss through rationing at 70 calories a day—Mr. J. STRACHEY replied: Sixteen.

Industrial Health Research Board

Mr. F. J. ERROLL asked the Lord President of the Council how long the post of secretary to the Industrial Health Research Board had been vacant; and what steps were being taken to fill it.—Mr. H. MORRISON replied: The board is part of the organisation of the Medical Research Council, and the secretarial duties are performed by members of the council's headquarters staff, one of whom has been giving whole time to the work since the board's previous secretary left at the end of September, 1946. The detailed work of the board has recently been divided among four committees dealing with special branches of occupational health and each of these has its own scientific secretary.

Obituary

CHARLES BOLTON

C.B.E., M.D., D.SC. LOND., F.R.C.P., F.R.S.

Dr. Charles Bolton, consulting physician to University College Hospital, died in London on Dec. 6 at the age of 74.

Born at Whitby, he began his medical work at the age of 16 as a pupil of a general practitioner who was a friend of his family. He especially valued this early training, for he believed that the recognition of physical signs was one of the most important and difficult parts of a medical education, and that skill in observation is most easily acquired before the mind has become burdened with much factual knowledge. Such store did he set on this form of instruction that even as a senior physician he continued to take many junior classes in clinical medicine.

Press Portrait Bureau

When he began his more formal education at University College, at which his elder brother, Joseph Shaw Bolton, had preceded him, his early experience proved of great value, and he carried off many of the medals, exhibitions, and scholarships. After qualifying in 1896, he held house-appointments under Rickman Godlee and F. T. Roberts, before becoming resident medical officer at the Evelina Hospital, and later assistant medical officer at the Eastern Fever Hospital at Homerton. It was here that his interest in medical research was aroused, and together with William Bulloch of the London Hospital he studied the origin of the agglutinins in the serum of an infant whose mother had contracted typhoid fever.

In 1900 he returned to University College Hospital, where he held the difficult office of resident medical officer during the building of the present hospital. In 1903 he was awarded a research scholarship of the Grocer's Company, and in the same year he was appointed to the staff of the Queen's Hospital for Children. Two years later he became assistant physician to U.C.H.,

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and seven years afterwards full physician. In 1908 the Graham research fund was instituted and Bolton was selected as its first director. The duties of this appointment were at first limited to the supervision and encouragement of research in the medical school, but within a few years they were enlarged to cover in addition the undergraduate teaching of general pathology. In 1914, when the directorship was joined to a full-time chair in pathology, he was succeeded by the late A. E. Boycott.

During the 1914–18 war Bolton was in charge of the medical patients of the war block at U.C.H., and for these services he was appointed C.B.E. in 1920. The Royal College of Physicians had elected him to their fellowship in 1909, and from 1933 to 1936 he was censor. He was elected F.R.S. in 1918. After being senior physician to his hospital for several years he retired from his appointments in 1935.

Few British physicians in the present century have been so successful as Bolton in combining the practice of medicine with research. Throughout his professional life he believed that a teacher in a large London medical school should actively investigate some problem in disease, and he had little sympathy with the present tendency to separate research from teaching appointments. In the course of his career he had three main research interests, and from these he seldom strayed. His early experience as a medical officer in a fever hospital deeply interested him in diphtheria, and a number of his early papers were devoted to its nervous and circulatory sequelæ. Later he turned to the investigation of cardiac œdema and gastric ulcers. For over thirty years he continued to work at these two problems, and few years went by without some published contribution upon one or both. Much of his work on œdema he brought together in his Oliver-Sharpey lectures in 1917, and on peptic ulcers in his classical monograph on *Ulcers of the Stomach* in 1913 and in his Croonian lectures on the Interpretation of Gastric Symptoms in 1928. In his research he was greatly influenced by the functional and experimental pathology of Cohnheim. He made most careful studies upon his patients to determine as closely as possible the morphological and physiological disturbances from which they suffered. He then attempted to reproduce the condition in animals in order to give greater scope for further experimental studies, and in such work his ingenuity and technical skill were outstanding. Although his main concern was always to discover the underlying functional disturbances, he spent much time on the problems of treatment, and a large proportion of his published papers were devoted to this practical aspect of medicine.

Most of Bolton's earlier papers were entirely the products of his own hands and pen, but after the 1914–18 war he collaborated more frequently. In 1922 he published with G. W. Goodhart his first paper upon gastric physiology, and began a happy and productive association which lasted for many years. In 1928 W. G. Barnard and he published their work on passive venous congestion of the liver which had been experimentally produced in animals. Even after his retirement from hospital practice, he maintained his interest in research as actively as before. With Goodhart he continued his study of duodenal regurgitation as a factor in the regulation of gastric acidity, while embarking with Payling Wright on the investigation of the paths of absorption of amino-acids from the intestines. Only on the outbreak of war in 1939, when research in the London medical schools had become almost impossible, did he reluctantly give up what had been a lifelong interest.

No-one who worked with Bolton failed to come under the spell of his personality. A fair Yorkshireman, of traditional build and appearance, he was an imposing figure in any group. While he was transparently forthright in his dealings and commanded the respect of his colleagues and assistants, his geniality shone through all his associations with his friends and patients, and no member of the staff at U.C.H. in his time was regarded more affectionately by his juniors and students. Recently one of his colleagues, F. M. R. Walshe, has again drawn attention to the objects of a teaching hospital—"to advance knowledge, to train doctors and to set an example of practice." By his success in all these objects Bolton was an outstanding figure in a particularly flourishing period in the history of his hospital.

In 1911 Charles Bolton married Ethel, the daughter of the late Henry George, who survives him.

THE LATE SIR JOHN FRASER

Prof. J. R. Learmonth writes: "Will you allow me to pay my personal tribute to Sir John Fraser? I had known and respected the man and his work for many years, when my appointment eight years ago to the systematic chair brought me into closer relationship with him. No-one could have been kinder to the newcomer. Naturally, I turned to him for guidance, and had from him wise counsel, proffered in that almost diffident way which must be familiar to the many who sought his advice, and which was inherent in the modest shy spirit that was his. Early in his life he must have forced himself to overcome his reserve, when occasion demanded, for it was clear to me that he had become a part of Edinburgh, and of Scotland, active in every cause in which he could help; and so acquiring a knowledge of people and of affairs which made him the ideal mediator (arbitrator would be the more accurate term, but he would have scorned it) who unfailingly achieved the possible, as only the selfless can. For this subjection he placated his reserve by generosities and kindnesses, especially to children, of number and extent known to none but himself.

"To my mind his professional work, prodigious in volume as it was, embracing all classes of society (though I doubt if he recognised these), and drawn from as wide an orbit as any I have known, provided a complete answer to the view held in some quarters that a great mind cannot obtain intellectual satisfaction from the practice of surgery. When he came to my wards in consultation, he would arrive—with that attractive slightly rolling gait—radiating hope and confidence: listen attentively to the history; make the deft and gentle examination that only he could; and then stand back a little, in the attitude so many will remember—head a little to the right, the right eye half-closed, the quizzical smile. Then came the opinion—obscurities clarified, a diagnosis, a line of treatment strained to the limit to secure any hope of favourable outcome. A word or two of encouragement to the patient, and he was gone. The experience was always fresh and always instructive.

"In his operating-theatre he was the artist. Confidence there was, sureness of touch, impeccable technique: and something more. Whatever he was doing, he gave one the impression of being in the throes of creation; each procedure was to him the making of a masterpiece. I remember so well, as I watched his last operating session in the Royal Infirmary—when he had, quite characteristically, set himself only one or two minor tasks—searching in my mind for the right word to describe his use of the gauze swab. 'Swabbing' and 'mopping' could be easily discarded; 'patting' expressed the correct amount of physical effort, but was too trite: 'caressing' seemed to me to be the word. The artist was at work, absorbed in his creation.

"To give up surgery for the principalship of the university must have been a trying decision for him; and to some it seemed that the transition would be too abrupt, that the previous life of service was unsuited to the direction of great academic and business affairs. Any doubts were speedily set at rest. He was an admirable expositor, both on formal occasions and in committee; and he acquired the ability to refuse—albeit courteously—an ability of which he had not shown evidence during his professional life. His plans for the university were on a lofty scale yet evolved with a precision of detail which had been the habit of his life. Some have come to fruition, some are in the making: his love for his university permeated all.

"Last Thursday afternoon every street in Edinburgh seemed to lead to St. Giles. The ceremony was an intensely moving one: the colourful pomp of the congregation, the service almost severe in its simplicity. But the tribute which would have pleased him most was the great gathering of those who, unable to gain admittance to the crowded cathedral, waited bareheaded outside the west door in the grey December dusk. His old patients, come to take their leave of him."

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Notes and News

THE DON'S WARNING

DOCTORS who read Nigel Balchin's book, *Mine Own Executioner*, can hardly fail to be impressed by the advice a deaf and spiritless don gives Milne in the first chapter. Milne, who has taken a first in physiology, anatomy, and chemistry, wants to train forthwith as a psycho-analyst. "'Well,' says this don, 'there's no doubt you'd have to qualify first. No doubt at all. It gives you'—he waved a hand—'all the background.'" Milne and Mr. Balchin hardly keep their patience with one so remote and ineffectual; but the rest of the book seems to vindicate him handsomely. If Milne had had "all the background" would he really have thought analysis was the thing for Adam Lucian? It seems doubtful. Mr. Balchin considers he made his blunder later, when he allowed Lucian to postpone a critical session and go home to murder his wife. Milne's hunch that all was not well was obscured by a headache: very human, but it led to the agonising death of a person of remarkable quality, and the suicide of Lucian himself. The strictures of the coroner are lightly wafted off by one of Milne's medical colleagues, who cleverly claims part of the responsibility. The lesson, for Mr. Balchin, seems to be that though we all make mistakes, the unqualified analyst, however good—and Milne, his fellow-workers all agree, is very good—will get no quarter when he blunders. For doctors, and perhaps especially for psychotherapists, the lesson is rather that a medical training, whatever its faults, helps one to deal humbly and cautiously with a psychosis.

The film, now showing in London, of this very interesting and well-written book, is presented by Alexander Korda and directed by A. Kimmins. The script is written by Balchin, and it follows the text so faithfully (though the scene with the don is omitted) that it becomes a kind of documentary of the book. There are some good paralysing shots at the end, when Milne is climbing a fireman's ladder to get to Lucian, solitary on the parapet of the great building; but on the whole the photography is competent without being stirring, and the same might be said of the cast.

DENTAL CARIES IN SWEDEN

THE Swedish Royal Medical Board is instigating investigations into the prophylaxis of dental caries. Completely healthy teeth are now found in only 3 out of every 1000 Swedish children between 7 and 15 years and in only 1 per 1000 young adults (average age 20). On the other hand, among the 870 patients in the Lund hospital for ineducable mental defectives 31 have perfect teeth.

CENSORSHIP OF PATIENTS' READING

THE question whether some form of censorship of the books read by patients in hospital is desirable was discussed at a recent meeting of the Guild of Hospital Librarians with Mrs. Buchanan in the chair. Miss Southernden, the member of the Croydon Public Library staff assigned to the work in general and mental hospitals, maintained the principle, generally accepted by public librarians, that the provision of books for patients in hospital is an extension of the home-library service, so they would be no more subject to restrictions than are ordinary readers. The suggestion that patients instead of being debarred in any way in their reading should receive special assistance from the librarian to guide their choice of books received general support. Mrs. Mackenzie, from the point of view of a lecturer in psychology, objected that it was not possible to discuss the subject in relation to patients as a body. It was necessary to study the reactions of the individual. The librarian can assess projection and motivation. Dr. L. Fairfield, a senior medical officer of the London County Council, supported the objection to any form of censorship, with the one exception that patients suffering from cancer should not be allowed to read books referring to that disease. Tuberculous and neurotic patients are not affected by books bearing on those subjects, and in fact the description of their own conditions may in some cases be helpful to patients. Maternity patients should not have fears aroused by books about abnormalities in childbirth but might well have any such ideas dissipated by good books about motherhood and child life. One type of reading to be avoided by the sick is the desultory reading which leaves no impression. She condemned "the ridiculously overplayed notions of bibliotherapy" prevalent in the United States.

University of Cambridge

On Dec. 6 the regent house resolved that from the beginning of the next academic year women shall be admitted to matriculation and degrees on the same terms as men. They will be eligible for appointment to all university offices except those of proctor and esquire bedell. Girton and Newnham, instead of being "recognised institutions," will be colleges of the university.

University of London

Dr. N. F. Maclagan has been appointed to the chair of chemical pathology at the Westminster Hospital medical school.

Dr. Maclagan, who is 42 years of age, was educated at University College School and University College, where he graduated B.SC. with first-class honours in 1925. In 1926 he was appointed to a research scholarship in the biochemical department of Middlesex Hospital, where the following year he began his medical training, while continuing to act as part-time assistant in the biochemical department. He graduated M.B. in 1932, and after holding a house-appointment under Dr. G. E. S. Ward, became assistant in chemical pathology to the Courtauld institute of biochemistry, where he later continued his researches on gastric secretion as a whole-time worker of the Medical Research Council. In 1935 he was appointed biochemist to the Westminster Hospital, but from 1939 to 1945 he was on leave of absence as pathologist at an E.M.S. sector pathological laboratory. In 1946 he returned to the Westminster Hospital medical school as chemical pathologist. Dr. Maclagan took his M.D. in 1935 and his D.SC. last year. He is also a fellow of the Royal Institute of Chemistry. His most recent work includes papers on liver function.

University of Dublin

On Dec. 3 at the school of physic, Trinity College, the following degrees were conferred:

M.A.O.—J. A. O'N. Mulcahy.

M.B., B.Ch., B.A.O.—Kurt Adler, C. L. S. Archer, Irene R. Christie, R. F. E. Coolican, Kathleen P. E. Crawford, Samuel Davis, J. R. Evans, Katherine S. P. Hill, Margaret W. Lamb, D. E. Mellon, T. J. Mills, P. R. Oliver, Irene S. Orgel, J. R. F. Smith, F. E. Williams, R. J. Yorke.

Royal College of Physicians of London

Dr. C. M. Fletcher will deliver the Goulstonian lectures at the college on Tuesday and Thursday, Jan. 13 and 15, at 5 P.M. He is to speak on Pneumoconiosis of Coalminers.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council held on Nov. 22, with Mr. William Gilliatt, the president, in the chair, the honorary fellowship was conferred on Field-Marshal Jan Smuts.

The following were admitted to the membership of the college:

R. J. McC. Jamieson, Joan E. W. Mackie, Stephen Parlee (absentia), Ada Sau Haan Wong (absentia).

The following candidates have satisfied the examiners for the diploma in obstetrics:

K. D. G. Abbott, E. A. J. Alment, G. J. Amiel, Geoffrey Anderton, J. K. Armstrong, W. C. Astley, Winifred N. Backhouse, A. B. Backus, Henrietta E. Banting, C. P. Bennett, W. R. Bodenham, C. C. Bowley, Michael Bruser, C. J. Champ, J. S. L'A. Chesshire, S. N. Cole, John Colquhoun, Janet E. W. Copland, J. M. G. Costello, H. H. Crabb, Robert Crawford, R. C. Cummin, D. V. Cummins, Nora C. Curran, Reginald Cutts, C. H. De Boer, N. S. Devi, C. J. Dewhurst, L. W. D. Drabble, W. J. Driscoll, Victor Drosso, J. G. Dumoulin, Alan Eckford, D. F. Edmiston, M. S. Ellensweig, John Eskell, Joseph Firth, J. H. Fisher, G. H. Flack, H. D. Freeth, H. J. Friend, R. W. Grayburn, E. G. Hall, Archibald Hanton, S. L. Hetherington, G. E. Hewett, N. M. O'C. Hicks, Robert Hodgkinson, E. I. Holloway, D. R. Hughes, Alexander Hunter, R. W. Hutchinson, C. G. Irwin, S. B. Jahan, E. W. Jeyaratnam, Arthur Joffe, F. W. Johnson, E. P. Jones, E. W. Jones, R. A. S. Keighley, P. G. S. Kennedy, R. W. Kennon, P. M. Kerr, J. E. Kerton, B. T. Kieft, Muriel G. King, Gouri Kirtane, W. H. Laird, J. L. Lawrence, R. P. Lawrie, J. B. Lawson, J. McL. Lees, M. H. Lloyd, Mary Love, Hugh McColl, Kathleen A. McDonald, Richmond McIntosh, Muriel MacKenzie, A. G. MacLeod, J. C. MacWilliams, A. S. Majury, H. N. Mansfield, Annamma Mathan, T. K. Maurice, T. D. F. Money, Ivy M. Morgans, M. F. Morton, W. H. Oesterlein, G. C. Pattanayak, J. H. Patterson, P. C. A. Posford, M. B. Quane, W. J. Ramsay, E. B. Rayner, D. H. Rea, D. D. L. Rees, J. G. Reynolds, Henry Roberts, P. S. Robinson, E. S. Rogers, Monica B. Roper, John Rushton, G. T. Rutherfoord, Helen Samson, Mary A. Saunders, P. G. Seed, Elizabeth S. M. Sherrard, D. W. Shields, Irene M. S. Sloper, Leonard Smalley, A. A. Smith, E. M. Southern, Elizabeth M. Stokes, Alan Taylor, A. P. Walker, John Watson, Joyce Watson, A. E. B. de C. Wheeler, Joel Wilbush, Mary L. Williams, R. B. Wilson, C. H. F. Wood, Esme M. Wren, R. B. Wright.

Industrial Injuries Advisory Council

Sir Wilfrid Garrett, late chief inspector of factories, has been appointed chairman of this council, which has been set up to advise the Minister of National Insurance on questions relating to the National Insurance (Industrial Injuries) Act, 1946. The 15 other members include Prof. R. E. Lane, F.R.C.P., and Mr. E. A. Nicoll, F.R.C.S.E.

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Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Dec. 1, with Prof. G. B. Fleming, the president, in the chair, the following were admitted to the fellowship:

Graham Herbert Anderson, Edward Kenyon Blackburn, Samuel Dunn, Rankine Good, Arthur Thomson Hendry, James Hood, William Macfarlane Lancaster, Thomas Davidson Veitch Lawrie, George McCracken, Alastair Goold Macgregor, Robert Montgomery, Archibald Walker Sloan, George Will, qua physicians; John Cuthbertson Jeffrey, Alexander Macpherson Keith, Shreedhar Shreenivas Kirtane, Andrew Bruce MacLean, Norman McSwan, William Albert Watt Maney, Purushottam Bhagwant Sulakhe, Andrew Tomney, William Arthur Leigh Tucker, Stuart Young, qua surgeons.

Royal College of Surgeons in Ireland

The following have been successful in the fellowship examination: D. P. Beckett, R. E. Fenelon, R. S. Murray, J. R. McElroy.

Human-milk Bank at Cardiff

A human-milk bank has been opened at City Lodge Hospital, Cardiff. There is a similar bank at Queen Charlotte's Hospital, London; and plans for the establishment of a bank in Birmingham were announced last May (*Lancet*, 1947, i, 774).

Naval Appointment

Surgeon Captain L. F. Strugnell has been promoted surgeon rear-admiral and appointed deputy medical director-general of the Navy in succession to Surgeon Rear-Admiral A. E. Malone.

Delinquency and the Educator

A course of six lectures on this subject will be given at the Institute for the Scientific Treatment of Delinquency, 8, Bourdon Street, London, W.1, by Miss Barbara Low, B.A., on Jan. 27, Feb. 3, 13, 24, March 2 and 9, at 6.30 P.M.

Volunteers Needed by Common Cold Unit

Further volunteers are required by the Common Cold Research Unit, Salisbury, for intranasal inoculation with fluid which sometimes contains the cold virus. Sessions which are not filled are the 10-day periods beginning Jan. 14 and 28, Feb. 11 and 25, March 10, April 14 and 28, May 26, and June 9. Further information is obtainable from the medical officer, Harvard Hospital, Coombe Road, Salisbury.

Red Cross Relief in India

Major-General T. O. Thompson, C.B., M.D., has been released by the Army to serve as British Red Cross commissioner in India and Pakistan. In view of the likelihood of exceptionally serious epidemics next spring, especially among refugees, the society has authorised the formation of mobile hospitals, ambulance convoys, and teams of specialists, and it has already dispatched supplies of penicillin, vitamins, and blood-plasma.

Epsom College

The council invites applications for a France pension of £30 per annum for a necessitous medical man fully 55 years of age, who has been registered for 5 years.

There are also available other pensions and grants for medical practitioners or widows, when vacancies occur, and scholarships and grants for boys and girls (not necessarily orphans) of public-school age and in need of such help.

Forms of application may be obtained from the secretary's office, Epsom College, Surrey.

Appointments

The Hospital for Sick Children, Great Ormond Street, London:

FAGG, C. G., M.B. Lond., D.C.H.: house-physician.
KING, ALISON, M.B. Edin.: house-surgeon.
REDSHAW, JOAN, M.B. Sydney, D.C.H.: house-surgeon.
WILSON, B. D., M.B. Lond., M.R.C.P., D.C.H.: house-physician.

London County Council Mental Health Service:

BATT, J. C., M.D. Brist., M.R.C.P., D.P.M.: physician deputy superintendent, St. Ebba's Hospital, Epsom.
SHAW, DAVID, M.D. Lond., M.R.C.P., D.P.M.: physician deputy superintendent, Sutton Emergency Hospital, Surrey.

Ministry of Pensions Medical Services Division:

CURRAN, KEVIN, M.B. N.U.I.: surgical officer B2, Rookwood Hospital, Cardiff.
DUNCAN, MARGARET, M.B. St. And.: medical officer B2, Rookwood Hospital, Cardiff.
JAMES, T. G. S., M.A., M.B. Camb.: medical officer B2, Queen Mary's Hospital, Roehampton.
THOMSON, G. R., M.B. Glasg.: surgical officer B1, Stoke Mandeville Hospital, Aylesbury.

Diary of the Week

DEC. 14 TO 20

Monday, 15th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Mr. D. W. C. Northfield: Intracranial Hydrodynamics.
5 P.M. Prof. Alexander Haddow: Carcinogenesis.
HUNTERIAN SOCIETY
8.30 P.M. (Talbot Restaurant, London Wall, E.C.2.) Mr. Aleck Bourne, Dr. Edward Sharp, Mr. John Howkins: Menstrual Disorders in Relation to General Medicine.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3 P.M. Prof. E. D. Adrian, O.M., F.R.S.: Elements of Nervous Activity. (First Harben lecture.)

Tuesday, 16th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. C. M. West: The Skin.
5 P.M. Prof. S. L. Baker: Absorption and Deposition of Bone.
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. J. E. M. Wigley: Pemphigus Group of Eruptions.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE
3 P.M. Professor Adrian: Effects of the Sense Organs. (Second Harben lecture.)
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Dr. J. A. Fraser Roberts, Dr. Eliot Slater: Genetics, Medicine, and Practical Eugenics.

Wednesday, 17th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. John Beattie: Autonomic Nervous System (Central).
5 P.M. Prof. J. W. S. Blacklock: Surgical Tuberculosis of Bovine Origin.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE
3 P.M. Professor Adrian: Activity of the Brain. (Last Harben lecture.)

Thursday, 18th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. E. G. T. Liddell, F.R.S.: Pyramidal Nervous System.
5 P.M. Dr. J. Hamilton-Paterson: Reticulosis and Lymph-gland Enlargement.

Friday, 19th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. J. Douglas Robertson: Calcium Metabolism.
5 P.M. Dr. Hamilton Paterson: Myelomata and Their Relation to the Hæmopoietic Bone-marrow.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Obstetrics and Gynæcology.* Mr. Everard Williams, Miss Catherine Lewis, Mr. Ogier Ward: Urological Problems in Relation to Gynæcological Surgery, with Special Reference to the Vesico-vaginal Fistula and the Divided Ureter.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. Franklin Wood: X-ray Kymography of the Heart and Lungs.

Births, Marriages, and Deaths

BIRTHS

GILLETT.—On Dec. 6, at Altrincham, Cheshire, the wife of Dr. Roger Gillett—a son.
SPENCER.—On Dec. 1, at Newcastle, the wife of Dr. Seymour Spencer—a son.
STANBRIDGE.—On Dec. 2, at No. 8 R.A.F. Hospital, Germany, the wife of Group-Captain R. H. Stanbridge, O.B.E.—a son.
STOTT.—On Dec. 4, at Chobham, the wife of Dr. Norman Stott—a son.
TAYLOR.—On Nov. 28, at Aberdeen, the wife of Dr. J. L. Taylor—a daughter.
TODD.—On Nov. 28, at Leicester, the wife of Dr. R. M. Todd—a son.
WALKER.—On Nov. 29, in London, the wife of Dr. David Walker—a daughter.
WELFORD.—On Nov. 25, the wife of Dr. N. T. Welford—a daughter.

MARRIAGES

BENNETT—CRANE.—On Nov. 28, in London, Reginald Bennett, B.M., to Henrietta Margaret Crane.
IRVING—BAILLIE.—On Nov. 29, at Bletchingley, Sir Miles Irving, C.I.E., O.B.E., to Emily Elspeth Grace Baillie, M.B.
MCCAULEY—TUCHMANN.—On Nov. 29, in London, Francis Joseph McCauley, B.ARCH., to Anna Marie Tuchmann, M.B.

DEATHS

BOLTON.—On Dec. 6, in London, Charles Bolton, C.B.E., D.SC., M.D. Lond., F.R.C.P., F.R.S.
FLEMING.—On Dec. 5, at Kinloch Rannoch, Robert Alexander Fleming, M.A., LL.D., M.D. Edin., F.R.C.P.E., F.R.S.E., aged 85.
FRASER.—On Dec. 1, in Edinburgh, Sir John Fraser of Tain, baronet, M.D. Edin., LL.D., F.R.C.S.E., F.A.C.S., F.R.A.C.S., F.R.C.P.E., F.R.S.E.
HIGGIN.—On Nov. 29, at Newton Abbot, Robert Francis Higgin, B.A., M.D. Camb.
LACEY.—On Nov. 29, in Cape Town, Bernard Warner Lacey, M.B. Durh.
SCOTT.—On Nov. 20, at Exeter, Robert Scott, M.B. Glasg.
THOMSON.—On Dec. 2, in London, William Brown Thomson, M.D. Glasg., D.P.H., aged 68.
URSELL.—On Dec. 4, at Cambridge, Siegfried Ursell, M.D. Munich.

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TREATMENT OF TUBERCULOSIS WITH STREPTOMYCIN AND SULPHETRONE

D. G. MADIGAN M.B. N.U.I.
P. N. SWIFT M.R.C.S.
GEORGE BROWNLEE B.Sc. Glasg., Ph.D. Lond.
From the Tuberculosis Chemotherapy Unit, County Hospital, Farnborough, Kent, and the Wellcome Physiological Research Laboratories, Beckenham

With an addendum on
The Histology of Typical Lesions after Streptomycin

G. PAYLING WRIGHT D.M. Oxfd, F.R.C.P.
SIR WILLIAM DUNN PROFESSOR OF PATHOLOGY, GUY'S HOSPITAL MEDICAL SCHOOL

STREPTOMYCIN can favourably modify the course of experimental inoculation tuberculosis in animals, even though it cannot be relied on to eliminate the causal organism (Smith and McClosky 1945, Feldman et al. 1945, Brownlee and Kennedy 1948b). When the infecting dose is sufficiently large, the disease, though partly suppressed, progresses throughout the period of observation (Brownlee and Kennedy 1948b) and there is no evidence of bactericidal activity in vivo. The same workers show that the susceptibility of the organisms remains unchanged after streptomycin and 'Sulphetrone' treatment in guineapigs.

From the published reports it is apparent that the antibiotic can influence clinical tuberculosis to a limited extent and under certain conditions. Thus Baggenstoss et al. (1947) report a fatal termination to 5 cases of miliary tuberculosis in children even though the disease in the lungs was favourably modified. The dosage in these cases seemed adequate, yet streptomycin could not be demonstrated in brain substance in which tuberculous lesions were observed. An earlier report by Hinshaw et al. (1946) records the survival of 4 out of 7 patients with proved tuberculous meningitis and improvement after treatment of surface lesions of the pharynx, trachea, and large bronchi. Once again all (3 out of 3) patients with miliary tuberculosis died. In other types of tuberculosis (peritoneal, skeletal, hepatic, renal tract, empyema, and cutaneous fistulæ) no permanent improvement could be demonstrated. It is interesting, in view of the observations reported here, that improvement with sputum reversal was recorded in 19 out of 24 cases of pulmonary tuberculosis.

Among the most impressive experimental evidence of the chemotherapeutic activity of antituberculotic drugs are the histological signs of healing of established tubercles in animals and man. Confirmatory evidence of this kind is presented here for man and is essentially similar to the histological evidence of healed miliary tubercles reported by Baggenstoss et al. (1947).

Like other drugs of natural origin, streptomycin has presented problems of purification. Besides having an intrinsic toxicity, commercially prepared streptomycin is more or less contaminated with impurities, important among which are pressor bases, depressor bases, and substances which damage the renal epithelium. The material used by us in the present trial was free from these impurities (Madigan et al. 1947) and appeared to owe such toxicity as it did possess to streptomycin itself. Further complications, however, should be clearly recognised. The possibility discussed by Madigan et al. (1947) that more than one streptomycin exists has been confirmed in the record of a third different molecule by Titus and Fried (1947).

METHODS AND CLINICAL MATERIAL

The opportunity to compare the efficacy of streptomycin with that of sulphone chemotherapy arose in June, 1946, with the supply of a limited quantity from the Wellcome Foundation in the form of seventeen batches which had been pharmacologically controlled. The material was supplied as a freeze-dried powder in phials containing the equivalent of 0·2 g. of pure streptomycin base, together with a supply of sterile pyrogen-free distilled water. Extensive biological control, reported in detail elsewhere (Madigan et al. 1947), had been exercised. The material had been tested for sterility and for freedom from pyrogens, histamine-like impurities, and, with one exception, antidiuretic substances. The average lethal dose of these batches in an acute experiment in mice was less than that of pure streptomycin. Towards the end of the trial it was necessary to use (intramuscularly) one batch of streptomycin which did not conform to these standards. Its history made it obvious that the histamine-like substances and pressor bases which it contained, in small amount, originated from a bacterial contaminant of the culture medium. For the purpose of intrathecal injection it was found that an isotonic solution resulted when the contents of one phial (0·2 g.) were dissolved in 18 ml. of distilled water. In practice 0·2 g. of streptomycin was dissolved in 2 ml. of distilled water, but even with such a hypertonic solution no acute toxic effects were seen.

Sulphetrone, which was included in the trial, is 4 : 4′-bis(γ - phenyl - N - propylamino)diphenylsulphone - tetrasodium sulphonate, the pharmacology and chemotherapy of which will shortly be described (Brownlee et al. 1948). Shown to modify favourably the course of inoculation tuberculosis of virulent human and bovine origin in guineapigs (Brownlee and Kennedy 1948a), it appears to be a slightly more efficient antituberculotic sulphone-derivative than 'Diasone' or 'Promin' and compares favourably with promin in the treatment of experimental tuberculosis in the guineapig (Brownlee and Kennedy 1948b). Its claim to superiority as the sulphone of choice rests on its lack of acute and chronic toxicity, in that adequate blood-sulphetrone levels have been maintained in man for longer than 12 months. (The full clinical reports of Anderson and Strachan (1948), Clay and Clay (1948), and Madigan (1948) are in preparation.)

The established regimen aims at obtaining and maintaining a blood-sulphetrone level of 7·5–10·0 mg. per 100 ml. of blood in patients treated in hospital. The daily dose is 6–9 g., fluids being restricted to 3 pints. During the period of adjustment, spread over some ten days, the initial daily dose of 1·5 g. is gradually increased. Fresh yeast and iron are given by mouth before and during treatment.

Two studies were made—(1) to assess the efficacy of streptomycin; and (2) to evaluate the possible synergic action of streptomycin and sulphetrone, in the light of the significant synergic action between streptomycin and sulphetrone reported in tuberculous guineapigs by Brownlee and Kennedy (1948b).

The limited supply of streptomycin restricted the experiment to 17 cases. The choice of clinical material was dictated by its presence in the hospital; but the main manifestations of human tuberculosis were covered.

CASE-RECORDS

Group I (Streptomycin only)

Case 1.—Girl, aged 2½ years, admitted to hospital July 20, 1946, with *tuberculous meningitis*, intermediate stage, bacteriologically proved.

Treatment.—Streptomycin 0·2 g. intramuscularly four-hourly plus 0·2 g. intrathecally once daily from July 29 to Aug. 10 (13 days). After 24 hours' treatment, level in cerebrospinal fluid (C.S.F.) 6·4 μg. per ml.; blood level 16 μg. per ml.

Course.—Modified favourably, but patient died on Aug. 10.

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Case 2.—Man, aged 34, admitted Nov. 19, 1946, with *tuberculous meningitis*, late stage, bacteriologically proved.

Treatment.—Streptomycin 0·2 g. intramuscularly four-hourly plus 0·2 g. intrathecally once daily from Nov. 19 to Nov. 21 (3 days). At 24 hours, blood level 8 μg. per ml.; C.S.F. level 6·0 μg. per ml.

Course.—No modification; patient died on Nov. 22.

Case 3.—Boy, aged 16, admitted Sept. 24, 1946, with *tuberculous meningitis*, late stage, bacteriologically proved.

Treatment.—Streptomycin 0·2 g. intramuscularly four-hourly plus 0·2 g. intrathecally once daily from Sept. 26 to Oct. 3 (8 days). At 24 hours, blood level 16 μg. per ml.; C.S.F. level 6·4 μg. per ml.

Course.—No modification; patient died on Oct. 3.

Case 4.—Boy, aged 1½ years, admitted Nov. 4, 1946, with *tuberculous meningitis*, late stage, bacteriologically proved.

Treatment.—Streptomycin 0·2 g. intramuscularly four-hourly plus one dose of 0·2 g. intrathecally from Nov. 4 to Nov. 5 (1 day). At 24 hours, blood level 8 μg. per ml.; C.S.F. level 3·2 μg. per ml.

Course.—No modification; patient died on Nov. 5.

Case 5.—Man, aged 26, admitted Nov. 26, 1946, with *tuberculous meningitis* proved subsequently by guineapig inoculation and associated with extensive bilateral fibro-caseous pulmonary tuberculosis. *Myc. tuberculosis* grown from sputa. Radiography showed infiltration of upper half of left lung, with cavitation; tuberculous infiltration of right upper zone.

Treatment.—Streptomycin from Nov. 27, 1946, to Feb. 17, 1947 (83 days). The initial daily dosage was 1·2 g., of which 0·2 g. was given intrathecally. At 24 hours, blood level 8·2 μg. per ml.; C.S.F. level 24 μg. per ml. From Nov. 28, 1946, to Feb. 17, 1947, the dosage was 2·4 g. daily, of which, from Dec. 14 to Jan. 27, 0·4 g. daily was given intrathecally. After 24 hours on this higher dosage, blood level was 16·4 μg. per ml.; C.S.F. level 82 μg. per ml. Heparin 2 mg. was given intrathecally daily from Jan. 2 to Jan. 27.

Course.—During the exhibition of streptomycin there was some remission of the clinical manifestations of meningitis. After the withdrawal of intrathecal streptomycin on Jan. 28 (62nd day) there was continuous improvement until March 4 (98th day), when no evidence of clinical meningitis was detected. There was a lag in the return of the C.S.F. to normal. No demonstrable change in lungs.

Case 6.—Woman, aged 29, admitted moribund Sept. 21, 1946, with *acute caseous tuberculous pneumonia*, bacteriologically proved, involving extensive area of right lung. Polypnœa required continuous oxygen. Radiography showed consolidation of right upper lobe and part of right lower lobe. Serial radiography showed extension of process in right lung with spread to left lung.

Treatment.—Streptomycin 0·2 g. intramuscularly four-hourly daily from Oct. 17, 1946, to Jan. 14, 1947 (89 days). Blood level 6·4 μg. per ml.

Course.—Clinical improvement. Serial radiograms showed less consolidation in right lung and apparent opening up of air spaces, but honeycombing of right upper lobe. Patient died on Jan. 14.

Case 7.—Boy, aged 16, admitted July 8, 1946, with *acute caseous tuberculous pneumonia* of left upper lobe, bacteriologically proved, with extensive bronchogenic spread. Severe constitutional disturbance. Radiography showed three segments of left upper lobe atelectatic, with large dorsal cavity; mottling of left lower zone; heart and trachea displaced to left; ground-glass shading of right upper lobe. Serial radiograms showed right paramediastinal area mottled; heavy mottling of right cardiophrenic and costophrenic angles. Extensive infiltration of left upper and lower lobes.

Treatment.—Intramuscular streptomycin 0·2 g. four-hourly from July 16 to Oct. 16, 1946 (92 days). Blood level 6·0 μg. per ml.

Course.—General condition improved. Hectic temperature reduced after 12 days of streptomycin course, but between July 8 and 27 there was a serious bronchogenic spread in right lower lobe, clinically and radiologically. Radiography on 67th day revealed remarkable clearing of right lung and reduction of infiltration in left lower lobe. Sputum not reversed. Erythrocyte-sedimentation rate (E.S.R.) unaltered.

Review at 6 months: active intervention necessary to control disease. Condition deteriorating.

Case 8.—Girl, aged 19, admitted Jan. 18, 1946, with bacteriologically proved *hæmatogenous tuberculosis* originating in mediastinal glands and involving lungs, 3rd lumbar vertebra, and right sacro-iliac joint. Severe constitutional disturbance. Proved tuberculous abscess over upper end of right sacro-iliac joint. Radiography showed loss of joint space between T8 and T9; erosion of lower and outer part L3; slight bony changes in right sacro-iliac joint; widespread hæmatogenous patchy infiltration of both lungs.

Treatment.—Intramuscular streptomycin 0·2 g. four-hourly from July 23 to Oct. 15, 1946 (84 days). Blood level 9·0 μg. per ml.

Course.—General improvement excellent. E.S.R. (Cutler) fell from 20–30 mm. to 7–10 mm. (normal 2–10 mm.). Weight increased 2 st. Radiography: original foci in lungs hardened and shrunk; spine unchanged.

Review at 6 months: progressive improvement; no tubercle bacilli found in sputum since Jan. 29, 1946.

Case 9.—Woman, aged 27, admitted May 22, 1946, with bacteriologically proved *tuberculous bronchopneumonia* and right pleural effusion. Pronounced constitutional disturbance. Radiography showed bronchopneumonic mottling of right apical and mid zones; right pleural effusion; slight mottling of left lower lobe. Second series of radiograms a month later showed more pronounced mottling in both lungs.

Treatment.—Intramuscular streptomycin 0·2 g. four-hourly from July 11 to Oct. 3, 1946 (84 days). Blood level 6·4 μg. per ml.

Course.—Temperature dropped from 98–99·8° to 97·6–99°F during course, and to normal 16 days before end of course. Weight increased 8 lb. E.S.R. (Cutler) fell from 25 mm. to 18 or 10 mm. Sputum, which at first contained tubercle bacilli, contained none on Aug. 8, after which there was no sputum up to Jan. 2, 1947. Radiography showed that original soft focal mottling became harder and less dense and pleural effusion was absorbed.

Review at 6 months: condition static; tubercle bacilli again appeared in sputum: radiography showed apparent further clearing of mottling, but there was a small cavity at level of right 1st interspace and a large one of tension type in apex of right lower lobe.

Case 10.—Girl, aged 7 years, admitted Sept. 18, 1946, with *acute miliary tuberculosis and terminal tuberculous meningitis*, bacteriologically proved. Constitutional disturbance limited to high temperature. Radiography on Sept. 17 showed classical picture of fine miliary tubercles.

Treatment.—Intramuscular streptomycin 0·2 g. four-hourly from Sept. 18 to Dec. 18, 1946 (89 days). From Nov. 27 to Dec. 12 0·2 g. was given intrathecally once daily. At 24 hours, C.S.F. level 6·4 μg. per ml.; blood level 16 μg. per ml.

Course.—Much clinical improvement until 65th day, when onset of clinical meningitis was noted. Serial radiograms showed progressive clearing of miliary lung picture. Radiogram on 88th day appeared completely normal. On 71st day clinical meningitis was manifest, which pursued its usual course until death on 89th day (Dec. 18).

Case 11.—Man, aged 25, admitted Oct. 11, 1946, with *acute generalised tuberculosis*, predominantly pulmonary and lymphatic, bacteriologically proved. Severe constitutional disturbance. Radiography showed classical picture of fine miliary tubercles of lungs.

Treatment.—Streptomycin from Oct. 11, 1946, to Jan. 21, 1947 (102 days): 1·2 g. intramuscularly daily from Oct. 11 to Nov. 13; 0·2 g. intrathecally daily from Nov. 20 to Dec. 13. At 24 hours, blood level 7·0 μg. per ml.; C.S.F. level 4·8 μg. per ml. Streptomycin raised to 2·4 g. intramuscularly daily from Nov. 14 to Jan. 21, with 0·4 g. intrathecally daily from Dec. 14 to Jan. 21. At 24 hours after start of higher dosage, blood level 14·0 μg. per ml.; C.S.F. level 48 μg. per ml. Heparin 2 mg. intrathecally given daily from Jan. 2 to 21.

Course.—Two distinct phases of almost equal duration (about 50 days). In the first phase the cervical glands regressed and the meningitis, of which clinical and cytological evidence existed on Nov. 18, disappeared by Dec. 18. Radiography showed gradual clearing of miliary picture, and by Dec. 26 lungs appeared normal except for residual miliary tubercles in left upper lobe. In the second phase the general condition deteriorated: the cervical glands enlarged and caseated, and clinical evidence of mesenteric glandular involvement foreshadowed generalised lymphatic tuberculosis. Radiography on Jan. 13 showed generalised coarser miliary tubercles in lungs. The patient died on Jan. 21.

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Group II (Streptomycin and Sulphetrone)

Case 12.—Man, aged 39, admitted June 5, 1946, with *acute fibrocaseous pulmonary tuberculosis*, bacteriologically proved. Severe constitutional disturbance. Radiography showed acute infiltrative lesion in posterior apex; cavitation in axillary area of subapical segment; infiltration in lower quadrant, pectoral segment of right upper lobe; infiltration in apex of right lower lobe.

Treatment.—Sulphetrone from June 21, 1946, to Jan. 23, 1947. Blood level 2–7 mg. per 100 ml. Intramuscular streptomycin 0·2 g. four-hourly from July 11 to Oct. 3 (84 days). Blood level 6·4 μg. per ml.

Course.—Hectic temperature modified 12 days after sulphetrone; temperature became normal 3 weeks after streptomycin stopped. Weight increased 11 lb. E.S.R. (Cutler) fell from 30 mm. to 4 mm. Tubercle bacilli were found in numerous specimens of sputum up to Aug. 29, 1946. Between then and Oct. 3 there were 11 negative smears, 3 negative cultures, and a negative animal test. Radiographic report on Nov. 28: infiltrative process halted; cavitation now not seen; acute lesion converted to chronic process.

Review at 6 months: areas of disease static, but cavity reopened; sputum again positive. The patient was readmitted to hospital on June 21, 1947, for collapse therapy; E.S.R. (Westergren) was then 28 mm. in 1st hour.

Case 13.—Man, aged 47, admitted May 4, 1946, with *chronic fibrocaseous pulmonary tuberculosis*, bacteriologically proved. Radiography showed fibrocaseous pulmonary lesions of right upper lobe; large cavity in right apex; fan-shaped area of decreased transluceney from apex to enlarged right root; left upper lobe suspect. Serial radiograms revealed extension of dense mottling to right middle and lower zones.

Treatment.—Sulphetrone given from May 21 to Oct. 3; blood level 2 mg. per 100 ml. Streptomycin 0·2 g. four-hourly given from July 11 to Oct. 3 (84 days); blood level 4·8 μg. per ml.

Course.—Diurnal temperature excursion increased, with reversion to normal 3 days after stopping streptomycin. Two phases were seen. During first 2 months there were 8 negative sputa; E.S.R. (Westergren) fell from 23 mm. to 7 mm. in 1st hour; and serial radiograms showed successive improvement. Second phase intervened at third month of therapy. Radiogram on Oct. 2 showed more mottling of right lower zone, with larger right apical cavity.

Review at 6 months: all sputa positive since Dec. 9; E.S.R. (Westergren) up to 70 mm. in 1st hour; serial radiograms confirmed advance of disease. Feb. 21, 1947: onset of right pleural effusion, which progressed to encysted tuberculous empyema, accompanied by prostrating toxæmia, general œdema, and ulceration of mouth. The patient died on Aug. 16, 1947.

Case 14.—Woman, aged 29, admitted April 27, 1945, with *bilateral tuberculous bronchopneumonia*, bacteriologically proved. Grave constitutional disturbance. Radiography showed bilateral bronchopneumonic tuberculosis affecting all lobes; and area of consolidation in right lower lobe.

Treatment.—Sulphetrone given from March 11 to Oct. 2, 1946; blood level 3 mg. per 100 ml. Streptomycin 0·2 g. four-hourly given from July 11 to Oct. 3, 1946 (84 days); blood level 6·4 μg. per ml.

Course.—Slight excursion of temperature range, reduced on withdrawal of streptomycin, and normal 8 weeks later. Weight, E.S.R., and sputum unchanged. Radiography on Sept. 8, 1946, showed change to fibrocavernous lesions with evidence of calcifying foci.

Review at 6 months: extension of fibrotic changes, with foci of calcification more in evidence.

Case 15.—Boy, aged 6½ years, admitted on Jan. 31, 1946, with *hæmatogenous pulmonary tuberculosis* of coarse miliary type, not bacteriologically proved. No meningeal symptoms; C.S.F. culture sterile. Mantoux test positive. His father had open tuberculosis. Radiography showed bilateral hæmatogenous pulmonary tuberculosis; lungs stippled with coarse miliary pattern, conforming to "chronic" miliary picture; enlarged mediastinal glands.

Treatment.—Sulphetrone given from Dec. 3, 1946, to April 17, 1947; blood level 8 mg. per 100 ml. Streptomycin given from Feb. 3 to April 17, 1947 (73 days); blood level 12·0 μg. per ml.

Course.—Clinical condition much improved. E.S.R. (Westergren) fell from 22 mm. to 18 mm. in 1st hour. Gained weight. Serial radiograms showed gradual regression of coarse miliary tubercles.

Review at 6 months: from May 30, 1947, temperature again began to swing; radiogram on June 13 showed enlargement of left root, with collapse of left subapical segment; enlarged left bronchial glands, with "hilar flare" towards subapical segment of left upper lobe; miliary mottling no longer seen; E.S.R. 52 mm. in 1st hour. Sulphetrone therapy was re-established on June 22, and by Aug. 22 E.S.R. was 6 mm. in 1st hour; weight had increased 9 lb.; radiography showed regression of root glands; and general condition had much improved.

Case 16.—Man, aged 36, admitted June 5, 1946, with *chronic renal tuberculosis*, bacteriologically proved. Ureteric catheterisation demonstrated tubercle bacilli from left kidney only. Radiography showed damage to left kidney, with some calcification.

Treatment.—Sulphetrone given from June 4 to Sept. 14, 1946; blood level 2·5 mg. per 100 ml. Streptomycin 0·2 g. four-hourly given from July 11 to Oct. 3, 1946 (84 days); blood level 10·0 μg. per ml.

Course.—No significant change.

Case 17.—Man, aged 21, admitted Sept. 13, 1945, with recently healed lesion of L2 and L3 vertebræ, *severe spinal caries of* D8–10, complicated by a large paravertebral tuberculous abscess bacteriologically proved, a large pure chylous effusion in right pleural cavity, peculiar lung mottling, enlarged cardiac shadow, and pericardial effusion. Serial radiograms to June 21, 1946, showed clearing but patchy consolidation in right lower zone, and large pear-shaped paravertebral abscess.

Treatment.—Sulphetrone given from June 21 to Dec. 19, 1946; blood level 4 mg. per 100 ml. Streptomycin 0·2 g. four-hourly given from July 11 to Oct. 3, 1946 (84 days); blood level 14·0 μg. per ml.

Course.—Positive sputum on Sept. 26, 1945, then numerous negatives (culture and animal). E.S.R. (Cutler) fell from 24 mm. to 4 mm. Weight increased 4 lb. Temperature became normal. Radiography showed lungs clearer.

Review at 6 months: clinical improvement continued; radiography showed lungs clear except for pleural thickening from right root to right cardiophrenic angle; and bony union of vertebræ T8 and T9; posterior surface of T9 wedged into T10.

CLINICAL APPRECIATION

Group I (Streptomycin only)

Cases 1–4 were of proved tuberculous meningitis in either an intermediate or a late stage. Though adequate streptomycin levels were continuously present in blood and C.S.F. for periods ranging from 8 hours to 13 days, no appreciable deviation was detected from the natural course of the disease.

Case 5 was a clinical meningitis, subsequently proved to be tuberculous by guineapig inoculation, in a patient with extensive bilateral fibrocaseous pulmonary tuberculosis. The prognosis was sufficiently grave to justify an increase of dose of streptomycin from 0·2 to 0·4 g. intrathecally for 44 days, with the result that high antibacterial levels were reached in the C.S.F. Possible obstruction of the foramina with fibrin was countered by the intrathecal injection of heparin 2 mg. (260 I.U.) daily, which immediately prevented the appearance of a fibrin web which previously had been a constant feature of withdrawn C.S.F. With the resolution of the meningitis no evidence of irreversible damage in the form of persistently raised intracranial tension, or its secondary effects, was found. The chronic pulmonary lesions, unlike those of acute miliary tuberculosis, were unaffected.

Case 6, an acute tuberculous pneumonia, showed immediate clinical improvement in 8 days owing to decreased consolidation of the right lung and opening up of air-spaces. The improvement was not maintained, and death terminated a complicated pathology in which heart-failure, a spreading venous thrombosis, and associated œdema played a part.

Case 7, also an acute tuberculous pneumonia, was treated for 92 days and had a constant blood-streptomycin level of 6·0 μg. per ml. A temporary apparent improvement was not maintained.

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In case 8 a generalised tuberculosis involving mediastinal glands, lungs, right sacro-iliac joint, loss of joint space between T8 and T9, and erosion of lower and outer part of L3 showed a slow improvement which did not appear to be modified by streptomycin.

Case 9, a tuberculous bronchopneumonia with a right pleural effusion, temporarily improved under streptomycin.

Case 10, one of three cases of miliary tuberculosis which showed clearing of the lungs, was adequately treated for 3 months. Between the 6th and 8th week of treatment there was a striking improvement in the patient's general condition, and spectacular radiological evidence of clearing of miliary tubercles was observed from the 7th week until death; the subsequent pathological and histological studies (see addendum) furnish evidence of healing of these lesions. It is of interest that, though the routine sample of C.S.F. taken on admission subsequently grew tubercle bacilli (one colony), the first sign of clinical meningitis was not elicited until the 66th day. After that the disease in the central nervous system pursued its inexorable course until death on the 89th day of therapy. Necropsy revealed an internal hydrocephalus from obstruction of the lateral and median foramina. Histological post-mortem evidence confirmed its tuberculous origin, though no organism was cultured. We decided to use heparin in the treatment of subsequent cases because we realised that this terminal state developed from a mechanical blockage originating in a pathological process which appeared to be no longer active.

In case 11 clearing of the miliary lung condition was first observed radiologically 4 weeks after exhibition of streptomycin, and appeared almost complete by the second month. This was followed later by the reappearance of coarse miliary tubercles. Early signs of meningitis detected 39 days after the start of treatment consisted of abnormal changes in the C.S.F., which began to return to normal after 3 weeks' treatment, and before heparin was given. In spite of the dose of streptomycin being increased to 2·4 g. daily the cervical lymph-glands continued to enlarge, caseate, and coalesce, confirming the clinical impression that the disease was again progressing. At necropsy, besides the old lesions, there were recent miliary tubercles.

Group II (Sulphetrone and Streptomycin)

In this group 6 patients received combined treatment. Cases 13, 14, and 17 were so gravely ill that no attempt was made to reach the optimal blood-sulphetrone level. In the case of chronic renal tuberculosis (case 16) the sulphetrone was excreted so rapidly in the urine that an effective blood level was not maintained. In cases 12 and 15 the blood-sulphetrone levels were satisfactory.

In case 12, a fibrocaseous pulmonary tuberculosis in a toxic and acutely ill patient with apparently low resistance, the hectic temperature and intoxication were modified after sulphetrone. During the combined course of sulphetrone and streptomycin the weight increased, the E.S.R. fell, and the previously positive sputum became negative. The acute lesion became chronic. Improvement was not maintained on withdrawal of the drugs, and collapse therapy was necessary.

In case 13, a chronic fibrocaseous pulmonary tuberculosis with cavitation, two phases were seen during the combined course of streptomycin and sulphetrone. In the first period of 6–8 weeks there was clinical and radiological improvement, with negative sputa, and the infiltration appeared to be halted. The second phase began suddenly and was characterised by rapid deterioration, both clinically and radiologically. At necropsy there was evidence of a breakdown of the patient's defences, leading to a progressive virulent infiltration.

Case 15 was a hæmatogenous pulmonary tuberculosis, not proved bacteriologically, in a Mantoux-positive child, aged $6^1/_2$ years, whose father suffered from open tuberculosis. Radiography gave a picture of coarse "chronic" miliary tuberculosis of the lungs. There were enlarged mediastinal glands. With adequate blood-sulphetrone and blood-streptomycin levels the clinical condition improved and serial radiograms showed a gradual regression of coarse miliary tubercles. A month after withdrawal of both drugs there was a new phase of pyrexia, and radiography showed much enlargement of the left lung root, collapse of the left subapical segment, enlarged left bronchial glands, and a "hilar flare." The condition was later controlled with sulphetrone.

The case of renal tuberculosis (case 16), which had showed a considerable diminution of the numbers of organisms excreted on a previous course of sulphetrone, was unaltered by combined therapy.

In case 17, the severe spinal caries with chylous effusion in the right pleural cavity, lung mottling, and pericardial effusion showed consistent improvement, which was maintained. There was sputum reversal, and the E.S.R. and temperature returned to normal. The lungs became substantially clear. The improvement was probably greater than would have been expected from sulphetrone alone.

TOXICITY OF STREPTOMYCIN

The interesting fact that the streptomycin supplied by the Wellcome Foundation caused only trivial toxic manifestations has been previously reported (Madigan et al. 1947). That the freedom from histamine-like impurities, pressor bases, and antidiuretic substances which characterised this material was not the sole reason is shown by the persistence of toxic signs when streptomycin from other sources has been used. Thus, in a clinical trial of streptomycin of 95% purity in 17 cases, renal and hæmatological toxic effects were found (Farrington et al. 1947) which McDermott (1947) believed to be due to the streptomycin itself. No symptoms of vestibular dysfunction or impairment of hearing were noted in our small series, though the intrathecal doses, 0·2–0·4 g. daily, were higher than those usually given, and the intramuscular dose, 1·2–2·4 g. daily, was within the incriminated range.

Temporary pain on injection, much of which was due to the injection of hypertonic solutions, was occasionally observed. The inorganic content was such that streptomycin 0·2 g. dissolved in 18 ml. of distilled water gave an isotonic solution. Two patients had 0·4 g. in 4 ml. for long periods by slow intrathecal injection with only temporary pain, which could be minimised by dilution and slow injection, and aggravated by concentration or rapid injection. The volume of C.S.F. withdrawn before injection did not affect the severity of the pain.

A temporary pleocytosis in the C.S.F., similar to that recorded by McDermott (1947), was observed in cases 5, 10, and 11 accompanied by signs of an acute increase in generalised meningeal irritation, lasting in case 11 for 24 days, and in cases 5 and 10 in a subacute form during the course of intrathecal injections. The onset of pleocytosis, mainly polymorphonuclear, and the acute meningeal irritation (case 11) coincided with the start of intrathecal injections. The pleocytosis reached a maximum in 3 or 4 days with cell counts of 8200 (polymorphs 66%), 1040 (polymorphs 72%), and 1280 (polymorphs 90%) per c.mm., compared with 25 (no polymorphs), 226 (polymorphs 49%), and 60 (polymorphs 90%) per c.mm. before intrathecal therapy.

A moderate mental confusion developed in case 5, but there was no evidence to incriminate disease or drug; in no instance did delirium or major mental disturbance appear. The attitude of the patients to repeated lumbar puncture was one of coöperation, in spite of the unavoidable discomfort and occasional subsequent pain.

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Signs of irritation of peripheral nerve-roots were seen in cases 5 and 11, and pain on pressure over the sciatic nerve, hyperalgesia and loss of tendon-reflexes referable to the site of injection, and pain over the sacrum in case 5. These signs resolved after withdrawal of the streptomycin.

After repeated injections, piercing the meninges caused acute local pain in cases 5 and 11. Acute cramp-like pain in the distribution of the sciatic nerve at the time of injection and lasting about 5 min. was noted in 2 cases.

The neck-rigidity, opisthotonus, and root signs reported in case 5 decreased on trial omission of the streptomycin and reappeared on its re-exhibition. At the end of the course of streptomycin the signs quickly disappeared; the cytology and chemical pathology reverted to normal more slowly.

Necropsy of the spinal cord in cases 1, 10, and 11 revealed a local non-specific meningitis.

Heparin 2 mg. injected in the streptomycin solution showed no local or systemic toxicity.

DEVELOPMENT OF RESISTANCE TO STREPTOMYCIN

Strains of tubercle bacilli isolated before and after therapy were tested for sensitivity to streptomycin. Except in the 4 cases of meningitis and the case of coarse miliary tuberculosis, from which no organisms were recovered before therapy, all 12 strains fell within a range of sensitivity of 0·25–0·5 μg. per ml. of streptomycin base. By comparison at the same time the laboratory human strains H37 and CN844 were sensitive at 0·5 μg. per ml., and the bovine strain CN809 at 1·5 μg. per ml. In 6 of the 7 cases from which the organism could be recovered immediately after 3 months' therapy there was a well-marked increase in resistance (see table). The test medium was Long's synthetic medium to which had been added 2% agar, 0·025% lecithin, and 0·005% 'Teepol.'

SENSITIVITY OF STRAINS OF TUBERCLE BACILLI BEFORE AND AFTER STREPTOMYCIN TREATMENT

Case no. ...	5	7	9	10	11	12	13	14
Before (μg./ml.)	0·5	0·5	0·5	0·5	0·5	0·5	0·25	0·5
After (μg./ml.)	25	64·0	—	0·5	12·5	4·0	1·2	12·5

Tests for sensitivity both before and after streptomycin revealed that growth was stimulated by streptomycin in a concentration just too low to inhibit it. This concentration was commonly 0·25 μg. per ml. before and after treatment and was independent of the composition of the media, being observed also with those of Corper, Petragnani, and Dubos and Davis (1946).

The clinical and histological evidence focused attention on the contrast between the ineffectivity of streptomycin in established phthisis and the healing of the young lesions of miliary tuberculosis. In an attempt to clarify this behaviour of streptomycin we carried out the following experiments in vitro.

A 14-day culture of H37 strain of tubercle bacilli of human origin grown on Petragnani slopes was washed from the slopes, lightly shaken with stainless steel balls, washed with saline, resuspended in isotonic saline to give a concentration of 0·5 μg. per ml., and stored at 37°C for 24 hours. It was next exposed to streptomycin in concentrations of 10,000, 1000, 100, 10, and 1 μg. per ml. for 24 hours, 10 days, 14 days, and 30 days before being reinoculated on to Petragnani slopes. At 24 hours no concentration of streptomycin inhibited the subsequent growth of the bacilli; after 10 days concentrations of 100, 1000, and 10,000 μg. per ml. inhibited growth; and after 14 days 10 or more μg. per ml. inhibited growth—a position which remained unchanged after 30 days.

We interpret these results to mean that streptomycin is not bactericidal.

In a second experiment the same culture of tubercle bacilli 0·5 μg. per ml. was immediately—i.e., without being stored for 24 hours at 37°C—sown on to solid Petragnani slopes containing various concentrations of streptomycin; the tubercle bacilli did not grow at concentrations above 0·5 μg. per ml. Similar results were reported by Middlebrook and Yegian (1946).

DEMONSTRATION OF VIABLE TUBERCLE BACILLI

We found it difficult to demonstrate viable tubercle bacilli in the body fluids of about half the patients treated with streptomycin. During periods of clinical improvement, and when many acid-fast bacilli were demonstrable in direct or concentrated smears, adequately controlled cultural methods repeatedly failed. That the difficulty is not entirely due to the lack of a specific reversal agent in the media is suggested by the fact that the tubercle bacilli isolated by animal inoculation at the same time appeared to be of low virulence to guineapigs. Thus, in cases 5, 9, 13, and 17 the inoculated guineapigs lived more than 6 months and, when killed, showed typical generalised tuberculosis.

DISCUSSION

Observers mostly agree that human and bovine strains of tubercle bacilli are inhibited from reproduction on favourable media in vitro by concentrations of streptomycin base ranging from 0·25 to 1·5 μg. per ml. Since there is no difficulty in maintaining a constant concentration in blood and C.S.F.—but not in brain substance (Baggenstoss et al. 1947)—of many times this amount, there is a logical experimental basis for the clinical findings.

The possibility must be considered that in the 4 cases of uncomplicated meningitis the disease and its resultant changes were too well established to respond to chemotherapy. Only case 1 appeared to show a temporary modification of the usual course. Certainly chemotherapy cannot be expected to influence, for example, the mechanical blockage of the foramina which is a terminal hazard in tuberculous meningitis. In this connexion it is regrettable that the apparent therapeutic value of heparin (see below) had not been observed at this time.

A recovery is recorded in a case of proved tuberculous meningitis complicated by extensive fibrocaseous pulmonary tuberculosis (case 5). For 62 days, during which large doses of streptomycin were given intrathecally, the concentration in C.S.F. was at least 24 μg. per ml. for the first 16 days, and thereafter at least 82 μg. per ml. During the last 25 days 2 mg. (260 I.U.) of heparin was given intrathecally daily. No evidence is offered here that these large doses of streptomycin are necessary, and the combination of smaller doses with heparin may be preferable.

The extensive healing of the miliary tubercles in cases 10, 11, and 15 was in striking contrast with the lack of healing in the progressive cases 6, 7, and 13. Not only did the serial radiograms show regression of the fine miliary tubercles in cases 10 and 11, but there was also complementary post-mortem pathological and histological evidence. In the uncomplicated picture presented by case 10 successful repair was far advanced and only minute inflammatory foci, containing no bacilli, marked the original tubercles. Though in case 11 a second phase was superimposed on the original lesion, the picture was identical. In striking contrast is the evidence of progressive disease furnished in cases 6 and 13 by the clinical, radiological, and necropsy records.

The explanation of the different effects of streptomycin must be sought in the different nature of the two pathologies. It might be supposed that the strains of tubercle bacilli, shown here to be originally equally susceptible to streptomycin, would suffer a common fate when

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exposed to apparently identical chemotherapy; but this is not so. Under the cloak of "apparently identical chemotherapy," very different forces are brought to bear on the tubercle bacillus. In miliary tuberculosis of the lungs arising from a hæmatogenous spread, bacillary foci may be subjected to both natural resistance (phagocytosis, &c.) and the specific chemotherapy of streptomycin. Whether this combined operation is successful must largely depend on the efficiency of the tissue reaction.

It is legitimate to infer that in those lung conditions in which therapy failed the tissue reaction was ineffective. A bronchogenic focus is a typical example; here the first lodgment of the bacillus is followed by pathological changes which prevent tissue resistance, in particular blood-borne resistance, from playing an effective part.

It is convenient to speak of this aspect of the host-parasite relationship as environment. We are concerned here with only those aspects of environment which influence bacterial growth and reproduction and thus reflect changes in the metabolism of the bacillus. The experimental finding that only the dividing tubercle bacillus is susceptible to streptomycin clearly reveals the device (if self-preservation may be so called) by which the tubercle bacillus survives. The capacity of the resting tubercle bacillus to develop resistance by by-passing the particular metabolic process with which streptomycin interferes does not conflict with the known facts of its inexacting metabolic requirements.

In the present series, 6 strains of tubercle bacilli which could be isolated immediately on completion of the course had acquired a resistance to streptomycin which was between five and a hundred times as great as the initial resistance. It seems significant that two of the cases which acquired resistance (cases 11 and 13) showed a preliminary clinical improvement followed by rapid deterioration. The histological study of case 11 (see addendum) provides an interesting commentary on the clinical report. The "type-I reactions" are healed tubercles in which no bacteria can be detected; they correspond in time to a phase of clinical improvement and radiographic evidence of clearing of the miliary picture; they also correspond in time to the isolation of a strain of tubercle bacillus susceptible to 0·5 μg. per ml. of streptomycin. The "type-II reactions" are young active tubercles without signs of repair and containing enormous numbers of fine acid-fast bacilli. The onset of this second phase corresponds to clinical deterioration, the reappearance of miliary tubercles seen on radiography, and the isolation of a strain resistant to 12·5 μg. per ml. of streptomycin. Case 13 showed clinical and radiological evidence of improvement for 6–8 weeks and subsequently a phase of rapid deterioration. Once again the second phase was associated with an increase in resistance, though not a very great one.

Both the terminal clinical phases and the necropsy findings in cases 11 and 13 emphasise that the deterioration was associated with unrestrained aggression by the tubercle bacilli. Case 11 at all stages showed lymphatic involvement but in the terminal state illustrated complete and gross tuberculosis of the lymphatic chain associated with enormous numbers of tubercle bacilli. Case 13, originally a low-grade infection, in its terminal stages showed overwhelming infiltration, progressing to empyema with erosion of the intercostal muscles.

The experimental observation, that streptomycin in a concentration just too low to inhibit the growth of tubercle bacilli stimulates growth, appears to have an added significance in the light of these observations. The fact that the optimal inhibition by streptomycin is exerted on the dividing cells of a sensitive strain no longer constitutes an embarrassment to a resistant strain.

The remarkable increase in resistance in strains of tubercle bacilli recovered from cases other than miliary tuberculosis is in contrast with the animal experiments in which resistance was not developed during a similar period of chemotherapy (Brownlee and Kennedy 1948b), a fact which emphasises the important effect of environment on the metabolism of the bacilli. Whether similar changes in metabolism are sufficient to explain the difficulties encountered in recovering the organism by culture and by animal inoculation after streptomycin therapy is worthy of further inquiry.

The experimental evidence for the synergism of sulphetrone and streptomycin is strong (Brownlee and Kennedy 1948b); but the clinical evidence, owing to the nature and limited number of the cases, does not provide a clear-cut answer. The impression persists, however, that the cases treated by combined therapy responded more favourably than they would have done on either drug alone. We are convinced that the status of both drugs justifies a clinical trial of their combined use in miliary tuberculosis of the lungs.

For tuberculous meningitis to be treated successfully by local chemotherapy, it seems essential that the cases should be treated early. Any means which can be found to prevent blocking of the median and lateral foramina should be adopted; our experience suggests that the daily intrathecal injection of 2 mg. (260 I.U.) of heparin may prove effective. Our experience suggests that miliary tuberculosis of the lungs may be successfully treated but that generalised miliary tuberculosis should be presumed in these cases and intrathecal therapy instituted.

We believe that the systemic exhibition of streptomycin is contra-indicated in the presence of chronic lesions of lungs or lymph-nodes, because it may stimulate resistant strains to rapid reproduction. The use of the drug is justified in tuberculous meningitis and miliary tuberculosis however, since they do not respond to any other treatment.

SUMMARY

In 17 cases of tuberculosis affecting different organs parenteral streptomycin was given for periods of between 13 hours and 3 months. The intramuscular four-hourly dose of 0·2–0·4 g. of streptomycin base gave blood levels of 6–16 μg. per ml. The intrathecal dose of 0·2–0·4 g., injected once daily, gave C.S.F. levels of 3–80 μg. per ml. after 24 hours.

In 6 of the 17 cases sulphetrone by mouth was also given, leading to a blood-sulphetrone level of 7–8 mg. per 100 ml. in 2 cases, and 2–4 mg. per 100 ml. in 4 cases. The toxic manifestations were trivial.

Of 4 cases of uncomplicated meningitis treated with streptomycin only, 1 showed a temporary modification of the usual course of the disease.

Within the same group, 1 adult with proved tuberculous meningitis, complicated by extensive fibrocaseous pulmonary tuberculosis, recovered from the meningitis. The tuberculosis of the lungs did not improve.

In 3 cases of miliary tuberculosis of the lungs complicated by tuberculous lesions elsewhere there was radiological evidence of temporary progression and apparently total regression of the miliary tubercles. In 2 of these cases, in which necropsies were done, histological study showed that the original tubercles were healed or healing, and that acid-fast bacilli were absent. The third patient, who received sulphetrone also, is alive and well.

Except for 2 cases which became clinically resistant, the results in all the cases were equivocal; but those patients who received sulphetrone also appeared to do better.

All twelve strains of tubercle bacilli isolated before treatment were sensitive to streptomycin; all six strains isolated immediately after treatment were five to a hundred times more resistant. This is contrasted with experiments in animals.

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In 2 cases (one of generalised lymphatic tuberculosis, the other of chronic pulmonary tuberculosis) from which strains resistant to streptomycin were isolated clinical resistance developed during adequate therapy.

Difficulty was experienced in demonstrating by culture and by guineapig inoculation viable tubercle bacilli in body fluids containing numerous acid-fast bacilli and obtained from about half the patients during streptomycin treatment.

The possibility of producing resistant strains which may be stimulated to rapid reproduction contra-indicates the exhibition of streptomycin in the presence of a chronic lesion of lungs or lymph-nodes.

The intractable nature of tuberculous meningitis and miliary tuberculosis justifies the use of streptomycin; early diagnosis is vital, and the combined use of streptomycin and heparin is suggested.

We wish to thank Mr. C. R. Kennedy and Mr. A. E. Fenton, of the Wellcome Research Laboratories, for isolating and identifying the straihs of tubercle bacilli, and testing their resistance; and Mr. S. R. M. Bushby for most of the streptomycin estimations.

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Histology of Typical Lesions after Streptomycin

(PROF. G. PAYLING WRIGHT)

The necropsy material in two fatal cases (11 and 10) was studied histologically to determine the tissue changes developing in cases of tuberculosis that had undergone protracted treatment with streptomycin.

CASE 11

In the lungs, liver, and kidneys two quite distinct types of reaction are present. Both are probably of a miliary tuberculous nature. The first, whose tuberculous ætiology might otherwise be in doubt, closely resembles that found in case 10, who is known to have had miliary tuberculosis. The second, though histologically atypical, contains very large numbers of acid-fast bacilli, morphologically like tubercle bacilli, in every characteristic lesion.

Type-I Reaction.—These lesions are small ovoid nodules, 400–600 μ long, lying irregularly in the affected organs regardless of their pre-existing normal structure. Fibroblasts are the most common cells in these lesions, many of which also contain some histiocytes and plasma cells. Most of the nodules are vascularised by small blood capillaries. No giant cells or typical epithelioid cells are present in any of the nodules, nor do any of them show signs of caseation. Gland-like remains of alveoli, such as are often found in areas of fibrosis in lungs, are occasionally present in and about the nodules. Between the cells of the nodule, and usually separating them fairly widely, are small irregular structureless masses which stain a light pink with eosin and a deeper pink with van Gieson's stain. From its morphology and staining reactions, this material is almost certainly recently deposited collagen. No acid-fast bacilli are present in any nodules of this type.

Type-II Reaction.—These lesions have an entirely different character and structure from those of type I, though, like them, they are distributed irregularly throughout the organs affected. They are roundish, and usually range from 200 μ to several millimetres in diameter; occasionally they are even larger. They are formed almost entirely of vast numbers of closely packed, degenerating, and dead histiocytes, though a few plasma cells are occasionally present near their margins. Only in the spleen are typical tubercles, with Langhans-type giant cells, found, and here they are fairly numerous. In the larger typical lesions the central parts are beginning to caseate, though the presence of much basophilic nuclear debris shows that this change only began shortly before death. All type-II lesions contain enormous numbers of fine acid-fast bacilli. There are no signs of any fibrous tissue reaction round the margins or in the vicinity of any lesions of this type.

Lesions in Individual Organs.—Lungs: numerous foci of both types distributed throughout the section. *Ileum:* active tuberculous lesions in both the submucosa and subserosa. *Liver:* one large and many small recent lesions; some of the older variety. *Pancreas:* nothing abnormal seen. *Spleen:* many lesions of both types. *Kidney:* one large recent and three old lesions. *Prostate:* nothing abnormal seen. *Thyroid:* many large recent lesions. *Brain:* very little cellular reaction in subarachnoid space; many acid-fast bacilli present.

CASE 10

In many of the organs small foci are present which have the following histological structure, and closely resemble the lesions of type I in case 11. The lesions are nodular, roughly 200–400 μ in diameter, and are distributed irregularly in the organs regardless of their pre-existing normal architecture. They exhibit various proportions of cells and intercellular material, though in most nodules the latter much predominate. All contain a large proportion of fibroblasts and smaller proportions of other types of cell. Histiocytes can be readily recognised from the dust particles in their cytoplasm. Some nodules contain many lymphocyte-like cells. No giant cells or typical epithelioid cells are present in any nodule. Many of the foci are vascularised by fine blood capillaries. All the nodules contain many small irregular masses of intercellular material, which stain pink with eosin and bright red with van Gieson's stain, and are thus almost certainly collagen. The amount of this material and the number of lymphocytes in the nodules appear to vary inversely. All evidence of the previous architecture of the tissues seems to have disappeared from these nodules, except in the lungs, where small gland-like acini, the remains of former alveoli, are sometimes discernible. No acid-fast bacilli are present in these lesions.

The lesions give the impression of being minute inflammatory foci from which the bacilli have disappeared and in which the reparative changes are far advanced though not yet complete. They may thus be regarded as indicating successful defence and reparative healing.

Lesions in Individual Organs.—Heart: nothing abnormal seen. *Lungs:* many characteristic nodules; some intra-alveolar œdema. *Liver:* some typical nodules, differing only from the above reaction in being rather smaller and less cellular; their distribution is irregular. *Pancreas:* nothing abnormal seen. *Spleen:* many typical nodules. *Adrenal:* nothing abnormal seen. *Meninges:* a section from the interpeduncular space shows a characteristic tuberculous reaction, with some giant cells and many epithelioid cells and lymphocytes; some of the larger foci show early caseation; no acid-fast bacilli found.

COMMENT

Though both the type-I and the type-II lesions are almost certainly of a generally disseminated miliary tuberculous nature, they present such different histological features and, by inference, such a different host-parasite relationship, that it is difficult to reject the view that they resulted from separate bacteræmias with bacilli of very different grades of virulence. The alternative explanation—that the resistance of the host had changed considerably between the two phases of dissemination—seems less probable in view of the comparatively short interval which, from the clinical history of the patient, appears to have separated the two events.

In type-I lesions all the many foci show every sign that the local infection has been successfully countered,

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for in all the nodules the processes of organisation and fibrosis are almost complete. These lesions closely resembled those described by Baggenstoss et al. (1947) for their case 3. In type-II lesions, which appear to have resulted from a more recent dissemination of bacilli, the foci seem to have been extending rapidly at the time of death. The lesions of this type might correctly be described as acute histiocyte abscesses. Except for some foci in the spleen, none of the lesions of either type resembled a typical miliary tubercle.

PRIMARY SPLENIC ABSCESS

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Wallace (1922), of Northern Rhodesia, appears to have been the first to describe primary splenic abscess in the African. He saw 49 cases in Broken Hill within a few years and gave an accurate account of its clinical features. The illness ran a relatively short pyrexial course with, as a rule, much constitutional disturbance. Wallace was not certain of its cause. He did not find the amœbic organism in any of his cases, and surface culture made on agar slopes at operation or post mortem never showed any growth. Wallace excluded various fevers, including relapsing, undulant, and typhus fevers, and syphilis. In some cases he recovered a spore-bearing bacillus, which he held responsible for the gas he found in the abscess.

In some of the cases reported by Wallace the condition of the spleen macroscopically resembled multiple infarction, though in most of them the entire splenic tissue was replaced by pus. I have reported sporadic cases in Mashonaland, the cause of which I could not determine (Gelfand 1947), and have suggested that splenic abscess may be a late stage of infarction in which the total blood-supply of the spleen is lost after thrombosis of the splenic vein, liquefaction with colliquative necrosis resulting. In this respect it is interesting that Wallace believed splenic abscess to be a manifestation of influenza, the causal bacillus producing the thrombosis in the spleen with subsequent softening, which was followed by invasion by gas-forming organisms from the intestine.

Wallace observed that many of his patients later developed thrombosis of the leg veins, with swelling and œdema of the affected limb. He reported inexplicable cases of cerebral and intestinal thrombosis. It is probable that these cases which Wallace encountered had idiopathic thrombophlebitis. This was later recognised as such by Fisher (1941) working in the copper belt, Northern Rhodesia.

In the case I previously reported (Gelfand 1947) a large gas shadow was seen radiographically in the abscess. In the present case a very large gas shadow is also visible. Efforts to demonstrate the cause of the gas shadow, such as gas-producing bacillus, proved unsuccessful.

CLINICAL PICTURE

Though the ætiology of primary splenic abscess remains obscure, the illness as a rule runs a characteristic course, and the diagnosis can usually be determined with little difficulty. The disease is generally seen in relatively young adults aged 18–35. My patients so far have all been males, though Wallace (1922) reports that 3 of his 49 were women. All of mine have insisted that their health was good before the onset.

The illness begins with abdominal pains, worst over the left hypochondrium. Simultaneously the patient develops pyrexia, which may be moderate or severe. He feels ill, and as a rule stops working. Soon the spleen begins to enlarge and, after a few days or a week, he becomes aware of a swelling over the splenic region. This swelling rapidly increases in size, and a few days later can be seen as an abdominal tumour.

The tumour is tender, though later the tenderness becomes less and may indeed be absent. The outline of the swelling follows that of a splenic tumour. It enlarges downwards and inwards, towards and often past the umbilicus. Unless one is observant, the case may be labelled as one of ascites, for the anterior abdominal wall may be much distended by the tumour. There is usually, but not always, a tympanitic note over the tumour. Wallace, who placed much reliance on this sign, wrote: "An abdominal tumour which corresponds in position and shape to an enlarged spleen and which is tympanitic on percussion is, I consider, pathognomonic of splenic abscess." A fluid thrill may be felt. In the case reported below, a succussion-splash was clearly audible on turning the patient somewhat rapidly on to either side. The blood usually shows a moderate leucocytosis.

Generally the patient will appear for treatment largely because of the abdominal swelling, which reaches its maximum within a fortnight. After this it remains constant in size. It would be interesting to know how long a patient with such a large collection of pus may continue without serious consequences. One young adult native male had an acute swelling which reached its greatest extent within two weeks, and I saw him in apparently good health four years later, with an enormous splenic tumour. According to Wallace, the tumour, if left untreated, usually ruptures into the abdominal cavity. This possible event I have not so far encountered, though it appears the most obvious complication.

DIAGNOSIS

As a result of the gross enlargement of the spleen, the left dome of the diaphragm is considerably raised, producing a distinct dullness, with a poor air entry or absent breath sounds, posteriorly at the base of the left lung. Thus the condition may easily be mistaken for pneumonia or an empyema in this region.

The elevation of the left dome can best be demonstrated radiologically. As a result, too, the heart is displaced to the right side (see figure). In my last three cases gas shadows were demonstrable. Wallace (1922) believed that gas-forming organisms were responsible for the gas he found in the abscess at operation. I have not, so far, been able to isolate any such organism. The radiological appearance of the gas shadow beneath the much elevated left dome of the diaphragm, with a fluid level below, might be attributed to the gastric gas shadow normally seen on radiography. This is possible but very unlikely, since the stomach lies beneath the spleen, and therefore, with so great a splenic enlargement, one would expect it to be displaced downwards and medially.

Thus, radiologically, there are three points which make the diagnosis of primary splenic abscess almost certain:

(1) Elevation of the left dome of the diaphragm.
(2) Contralateral displacement of the heart.
(3) A gas shadow below the dome and above a distinct fluid level. So large a gas shadow with a fluid level may be mistaken radiologically for a hydropneumothorax or an eventration of the left dome of the diaphragm.

After positive radiological proof has been obtained the diagnosis is confirmed by aspiration. The pus is chocolate brown or reddish-brown and very like anchovy-sauce pus; but this colour is probably derived from the deep brown splenic tissue. Microscopical examination reveals amorphous material with little structure and few or no pus cells. Culture is usually sterile. Amœbæ are not demonstrable.

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X-ray photograph of chest showing elevation of left dome of diaphragm almost to level of sixth intercostal space, with large gas shadow and fluid level below, and heart displaced to right.

In the present case a careful effort was made to isolate the gas-producing organism in the pus, but this proved unsuccessful. There was no history suggesting amœbic disease. Amœbic abscess of the spleen has previously been reported, but the course in primary splenic abscess is quite different. This applies particularly to its rapid onset and the appearance of an enormous tumour within a short time. Emetine is without effect.

TREATMENT

The treatment of primary splenic abscess recommended by Wallace is surgical drainage. So inflammatory a tumour cannot be removed, owing to the perisplenic adhesions. Secondly, the tumour is so enormous that successful removal in toto is rendered impossible. On the other hand, aspiration is often disappointing; owing to the chronically inflamed capsule which is left behind, a pus-discharging sinus usually persists many months.

CASE-RECORD

An adult native male, aged about 27, was admitted to the Native Hospital, Salisbury, on June 29, 1946, his home being in the Mrewa Reserve, about 55 miles away. He was intelligent and gave a coherent account of his illness. He was apparently in very good health until a week before admission, when he had noted pain in the splenic region and a mass which had rapidly increased in size. The mass had reached its present size in about seven days. Otherwise he made little complaint, there being no cough, headache, vomiting, or history of hæmoptysis. There was no previous history of dysentery, diarrhœa, or any disturbance of micturition.

On examination he was poorly nourished and thin. Conjunctivæ well coloured. Corneal opacity in right eye. No icterus. Tongue furred, but edges of good colour. Gums not spongy. Well-marked signs of pellagra over legs, forearms, and trunk. No œdema or adenopathy. Fingers not clubbed. Neck veins slightly distended.

Temperature on admission 101·6°F, and this figure was maintained to a greater or less extent both before and after the operation. Apex-beat about 1 in. within left nipple line. Systolic murmur present, best heard over mitral area. Dullness both anteriorly and posteriorly in lower zone of left lung. Scattered rhonchi audible in rest of left lung and in right lung.

Blood-count: red cells 4,310,000 per c.mm., Hb 67%, colour-index 0·77, white cells 17,300 per c.mm. (neutrophils 37%, lymphocytes 52%, monocytes 9%, eosinophils 2%).

A large fluctuating swelling occupied the left hypochondrium and the epigastrium. Umbilicus displaced downwards. Lowermost limits of swelling extended to about 2 in. to right of and just below umbilicus. Lower edge of swelling could be fairly easily defined. Mass slightly tender; fluid thrill easily elicited. On moving the patient on to either side a succussion-splash was also audible. Mass resonant to percussion. Both flanks dull. Whole abdomen distended, superficially resembling ascites.

Radiography of chest showed left dome of diaphragm to be considerably elevated, reaching up to sixth intercostal space. Beneath dome was a gas shadow about $3^1/_2$ in. high and about 5 in. across. Below gas shadow was a dense shadow showing a fluid level. Heart displaced to right (see figure).

Wassermann reaction of blood negative. No parasites found in stools. Urine contained albumin and numerous leucocytes.

On the 30th a diagnostic aspiration was performed and the diagnosis of splenic abscess confirmed. The pus was of an anchovy colour. No organisms were isolated on culture of the pus, and no amœbæ were discovered. The cytology of the pus revealed nothing characteristic, only a few scattered pus cells being present.

Treatment and Progress.—The case was referred to Mr. E. Barnett, who drained the abscess on July 3. At least 14 pints of watery chocolate-coloured pus was evacuated. Two drains were inserted through the abdominal wall, one laterally and the other anteriorly. After the operation a course of emetine was administered (gr. 1 daily for ten days by intramuscular injection) but without any significant effect on the discharge.

The patient made satisfactory progress in hospital except that pyrexia up to 101·5°F continued in an irregular manner and the pus continued to discharge through the anterior drain. His general condition, however, was much improved. He was discharged from hospital in the middle of August and returned to the clinic in the Mrewa Reserve. Inquiries made at the clinic a month later revealed that the discharge from the abdominal sinus was still fairly profuse.

SUMMARY

A case of primary splenic abscess in a young African adult is described.

The chief radiological signs of the disease include elevation of the left dome of the diaphragm; a large gas shadow, with a fluid level, beneath the left dome of the diaphragm; and contralateral displacement of the heart.

The clinical features of primary splenic abscess are described.

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ANTITHYROID ACTIVITY OF ERGOTHIONEINE IN MAN

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With comments by

Mr. A. LAWSON, PH.D., and Prof. C. RIMINGTON

THE finding of Lawson and Rimington (1947) that ergothioneine has an antithyroid effect of a magnitude similar to that of thiouracil when tested in rats is of great interest, as has already been pointed out (*Lancet* 1947). The natural occurrence of this substance in blood suggested that it might be involved in the regulation of thyroid function. Also, since the quantity in the blood is said to depend partly on the diet (Eagles and Vars 1928), it seemed possible that this substance might be important in the genesis of simple goitre. It was therefore desirable to test the antithyroid effect of the compound in man. A simple method for doing this, using radioactive iodine, has recently been described (Stanley and Astwood 1947).

The ergothioneine was isolated from commercial powdered extract of ergot (Lilly) by the method of Pirie (1933). It was purified by recrystallisation from water as the hydrochloride

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and converted to the free substance by neutralisation of an alcoholic solution of the hydrochloride with pyridine; the precipitated free ergothioneine was dried in vacuo over sulphuric acid. The hydrochloride melted at 210–211°C (uncorrected), and the free substance at 260–265°C (uncorrected) with decomposition. Analysis showed—

Calculated for $C_9H_{15}O_2N_3S$: C, 47·17; H, 6·59; N, 18·33; S, 13·98.

Found: C, 47·14, 46·89; H, 6·36, 6·51; N, 19·05, 18·87; S, 14·17, 14·28.

The intensity of the colour produced with Hunter's reaction (Hunter 1928) was in agreement with the artificial phenol-red standard solution described by Hunter. The substance gave a positive test with Grote's reagent (Grote 1931). After addition of the material to whole blood, so that the final concentrations were 2 to 12 mg. per 100 ml., analysis by Hunter's method, after deproteinisation with tungstic acid, revealed an average recovery of 60%. Attempts to determine the material in whole blood after its administration were uniformly unsuccessful, indicating that concentrations in the blood of more than 0·05 mg. per 100 ml. were not achieved with the doses used.

Ergothioneine was administered by mouth to five normal persons in doses of 50, 200, and 400 mg., and intravenously in doses of 120 and 400 mg. Fig. 1 shows that each of the tests with radioactive iodine on these persons was completely negative. Fig. 2 shows the results obtained in four normal persons: one untreated; one injected intravenously with 1 g. of sodium thiosulphate, a substance said to be beneficial in thyrotoxicosis (Biancalana 1947); and, for purposes of comparison, one given 10 mg. of mercaptoimidazole, a potent antithyroid agent, and one given 50 mg. of methylthiouracil.

In view of these unexpected results ergothioneine was tested in rats by the usual method of feeding in the diet (Astwood et al. 1945), and by the method of Lawson and Rimington (1947) of daily subcutaneous injections. The daily injection of as much as 5 mg. to rats weighing 50–100 g. exerted no significant effect on the weight or on the iodine content of the thyroid gland in ten days. Likewise, the feeding in the diet of as much as 0·03% of ergothioneine for ten days was completely without effect on the thyroid gland. Parallel experiments with small doses of thiouracil yielded the usual result.

To test the possibility that some other antithyroid compound closely related to ergothioneine might be present in the ergot extract, a crude preparation consisting of the entire cuprous ion-precipitable material was fed to rats for ten days. Each animal received a quantity of "ergothioneine" amounting to 20 mg. daily as determined colorimetrically. The weight and the iodine

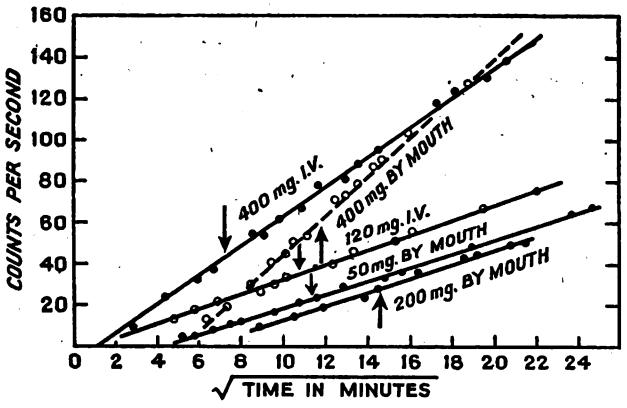

Fig. 1—Rates of accumulation of radioactive iodine in the thyroid region in five normal persons. The radioactivity, measured with an externally placed Geiger counter, was plotted against the time in minutes on a square-root scale, and straight lines were fitted to the points by eye. The arrows indicate the time when the ergothioneine was administered either by mouth or intravenously (I.V.), and the various doses expressed in mg. of the hydrochloride are shown. It is to be noted that no significant deviation from the predicted rectilineal curve of uptake was brought about by the ergothioneine.

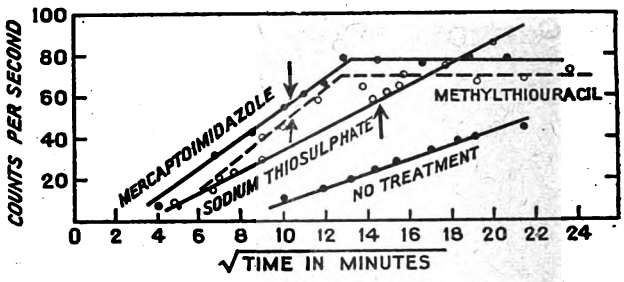

Fig. 2—The course of iodine accumulation in four normal persons is shown for comparison with fig. 1. The usual straight-line course was observed in the untreated subject. The intravenous injection of 1 g. of sodium thiosulphate did not modify the course of iodine uptake. The administration of 50 mg. of methylthiouracil by mouth caused the iodine uptake to cease, and the inhibition lasted for four hours. Mercaptoimidazole in a single dose of 10 mg. by mouth completely inhibited the iodine accumulation; in this instance the effect lasted for twenty-four hours.

concentration of the thyroid glands remained unchanged. Similar tests with sodium thiosulphate administered subcutaneously in doses of 0·5 and 5 mg. twice daily or given in the diet in 1% concentration were entirely negative.

It was concluded that, by the methods used, the substance isolated from ergot extract, giving appropriate analytical data for ergothioneine, failed to exhibit an antithyroid effect in the human being, or in the rat, in the dosages employed.

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Comments

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C. RIMINGTON M.A., Ph.D. Camb., D.Sc. Lond.

Professor Astwood has kindly allowed us to read his communication with Dr. Stanley. We have some comments to make on their findings, and further observations to report.

Since our first publication (Lawson and Rimington 1947) we have obtained sufficient ergothioneine to carry out therapeutic trials in two patients with thyrotoxicosis. The drug was administered by intramuscular or subcutaneous injection at a level of 100 mg. of hydrated hydrochloride, equivalent to 79 mg. of ergothioneine base, per patient per day for fourteen days in one case and seventeen days in the other.

This amount was chosen as being roughly equivalent, from our previous rat tests, to the dose of thiouracil normally given by mouth to thyrotoxic patients in University College Hospital. In neither case was there any change in the basal metabolic rate or other sign of clinical response.

Much effort has been spent on the problem of the quantitative determination of ergothioneine in whole blood, plasma, and urine; but so far a reliable procedure has not been devised. Experience with the Hunter (1928) method quickly showed that, though satisfactory for solutions of pure ergothioneine, it was inapplicable to biological fluids. Recoveries of ergothioneine added to blood or even to blood filtrates were low and variable, and such losses were particularly great with plasma. Some, but not all, of the factors responsible for these irregularities have been detected.

Sullivan and Hess (1933) have used Folin's uric-acid reagent for the determination of ergothioneine in urine, but they were able to isolate only a small percentage of

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the quantity which this reagent indicated to be present. The use of this method appeared to us unsafe until results could be confirmed by a more specific procedure. Our colleague, Dr. C. E. Work, has therefore adapted the technique of paper-partition chromatography to the problem in a roughly quantitative manner, details of which will shortly be published. This method, which has the great merit of specificity, afforded figures for normal urinary excretion of about 150 mg. of ergothioneine a day. In view of such a surprisingly high figure, it may well be that the dosage level of 79 mg. used for our patients was totally inadequate.

Astwood and Stanley have apparently experienced the same difficulty with the Hunter technique as we have, but we do not understand their statement that blood-ergothioneine levels no higher than 0·05 mg. per 100 ml. were achieved with the doses they used in normal persons. If this is the total ergothioneine they measured, it is less than 1% of the amount stated by Hunter to be present in normal human blood.

Astwood and Stanley have also not observed a lowering of the iodine content of the thyroid glands of rats dosed with ergothioneine by mouth or even by injection of large amounts of the drug. This difference from our own results we cannot at present explain.

There seems to be no reasonable doubt about the identity of the materials used. Our preparations, dried in vacuo, afforded the following figures on analysis:

Preparation A: melting-point 112°C. Found: N, 15·87, 15·67; S, 11·95, 12·08; Cl, 13·35, 13·33.

Preparation B: melting-point 112–113°C. Found: C, 39·85; H, 6·21; S, 12·25.

Theoretical: C, 40·76; H, 6·04; N, 15·82; Cl, 13·37; S, 12·05.

In all experiments the material given was the hydrochloride.

When we first used the extraction method of Pirie (1933) without modification, we invariably obtained, together with ergothioneine, a product which was inactive in the rat test and appeared to be guanine. Guanine gives an intense colour with the diazo reagent but no colour in the gold-chloride test, and is free from sulphur. When the method of extraction was modified, a good yield of ergothioneine was regularly obtained.

In constructing our reference assay curve for thiouracil by the rat method,* we noted that the line we obtained relating thyroid iodine to dose per kg. of body-weight (on log. scale) was displaced much to the left of that published by McGinty and Bywater (1945). In other words, the fall in iodine content of the glands from the mean figure of the controls (about 58 μg. per 100 mg. of wet weight) was some three or four times greater in our animals than in those of the Detroit workers. This difference may be due to differences in the iodine contents of the basal diets, since Vanderlaan and Vanderlaan (1947) have shown that antithyroid drugs of the thiouracil type do not lessen the power of the glands to concentrate iodide from the blood, and that the residual level of iodine determined in the glands of drug-treated animals represents mainly the inorganic iodide which these have taken up from the body fluids. McGinty and Bywater (1945) say they fortify their diet with 12 μg. of iodine per rat per day, given as potassium iodide. Our basal diet was unfortified. It is at present being analysed for iodine.

We also noted that, whereas thiouracil in doses of 2–5 mg. or more per kg. of body-weight brought the gland iodine of our animals to a minimum of about 5 μg. per 100 mg. of body-weight, even large doses of ergothioneine rarely lowered this beyond about 10–15 μg. per 100 mg. of body-weight. The reason for this difference is not clear.

Astwood and Stanley mention that they did not note any hyperplasia of the thyroid produced by ergothioneine. In our experience this was not pronounced (at 20 mg. per kg. of body-weight subcutaneously for fourteen days) but, we venture to think, unmistakable, as in the following example:

WEIGHT OF THYROIDS OF CONTROL AND ERGOTHIONEINE-TREATED RATS. DOSE 20 MG. PER KG. OF BODY-WEIGHT SUBCUTANEOUSLY FOR FOURTEEN DAYS

—	Controls			Treated			
Body-wt. (g.)	166	144	145	151	171	157	173
Thyroid wt. (mg.) ..	13	11	13	15·5	20·5	17·5	16
Thyroid wt. (mg. per 100 g. of body-wt.) ..	7·83	7·65	8·97	10·25	12·0	11·15	9·25

In view of the findings of Astwood and Stanley we are repeating our experiments on rats to discover the cause of our disagreement. A consideration which has not escaped us is the possibility that ergothioneine (R.SH) may suffer oxidation to the disulphide (R.S-S.R) and we have reasons for thinking that an equilibrium may exist in vivo between these forms, thus accounting for many of the difficulties of quantitative determination. A disulphide form might have little or no antithyroid effect.

We are indebted to Messrs. Burroughs Wellcome & Co. for generously preparing 10 g. of ergothioneine hydrochloride from ergot, which enabled us to conduct the preliminary trials. The patients were under the supervision of Prof. H. P. Himsworth, Dr. W. R. Trotter, and Dr. M. E. Morgans, whom we wish to thank for their collaboration. We are indebted to Dr. R. E. Moore for the thyroid weights quoted.

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* Our assays are conducted on immature rats weighing uniformly 45–55 g. as recommended by McGinty and Bywater (1945).

WERNICKE'S ENCEPHALOPATHY SIMULATING DIABETIC COMA

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HYPERGLYCÆMIA with Wernicke's encephalopathy has not been described before, and the case reported here closely resembled diabetic coma.

A man, aged 63, was admitted to hospital with a history that two weeks previously he had gone to bed with a septic corn on the left foot. The leg became red and swollen to the knee.

Three days before admission he became drowsy and refused food and drink. His wife said that his usual diet was: breakfast, bread and butter, tea; lunch, meat and vegetables; tea, bread and butter with jam or fish or meat paste, tea.

On Examination (in the casualty department).—A wasted dehydrated man, with a red glazed tongue, too apathetic to give more than a vague account of himself. The urine contained much sugar and albumin but no ketones. His left foot showed brown discoloration, with increased segmentation

* Dr. Robinson died shortly after this paper was written.

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Time	Blood-sugar (mg. per 100 ml.)	Insulin (units)	Intravenous fluid (litres)	Blood-pressure (mm. Hg)
12 noon	800	50 I.M. 50 I.V.	2 of normal saline, rapidly	Unrecordable
4 P.M.	1000	50 I.M. 50 I.V.	...	95
8 P.M.	1000	200 I.M.	..	110
12 mid-night	750	200 I.M.	1 of plasma, taking 2 hr.	70
3 A.M.	..	..	2 of 5% glucose-saline	70
9 A.M.	..	..	2 of 5% glucose-saline	115
12 noon	380	100 I.M.	..	110

pattern of the skin, and a septic corn on one toe. No cheilosis.

Progress.—He was admitted as a case of inanition but within twenty-four hours deteriorated to a restless comatose state, with irregular nystagmus and quick jerking movements of the face, neck, and arms. His breathing was irregular, jerky, and interrupted by short grunts.

Nervous System.—The limbs were rigid and the deep reflexes absent; Chvostek's and Trousseau's signs could not be elicited. The cerebrospinal fluid was under increased pressure but otherwise normal (total protein 0·05 g. per 100 ml.; Lange's test 00000000; lymphocytes 1, polymorphs 9, and red blood-cells 2380 per c.mm.). Feeding by mouth had been impossible, and the dehydration and emaciation were more striking. Peripheral failure was well marked, the blood-pressure being unrecordable and the extremities cyanosed.

Urine.—Catheter left in for incontinence. Urine contained much sugar and albumin, with pus cells and *Bact. coli*, but still no ketones; nor could any acetone be smelt in the breath. Blood-urea 114 mg. per 100 ml.

Diagnosis.—He was regarded at first as being in diabetic coma and not excreting ketones because of renal failure; but when blood examinations showed neither lipæmia nor ketones (Rothera) a hypothalamic vascular lesion was considered. Wernicke's encephalopathy was not diagnosed until the third day, when intensive treatment with vitamin-B complex was begun.

Further Treatment and Progress.—The treatment given and findings during the first twenty-four hours are shown in the accompanying table.

At 6 A.M. next day the blood-sugar was 150 mg. per 100 ml. and the patient was conscious enough to use the commoner expletives and take fluid by mouth. His general condition was much improved and dehydration less.

For the next fifteen hours his blood-pressure remained 110 mm. Hg and his general condition improved further, so that he could answer questions. During this time he vomited altered blood several times and passed several melæna stools. There was still slight nystagmus, but the other muscular movements had almost disappeared. The limbs remained rigid.

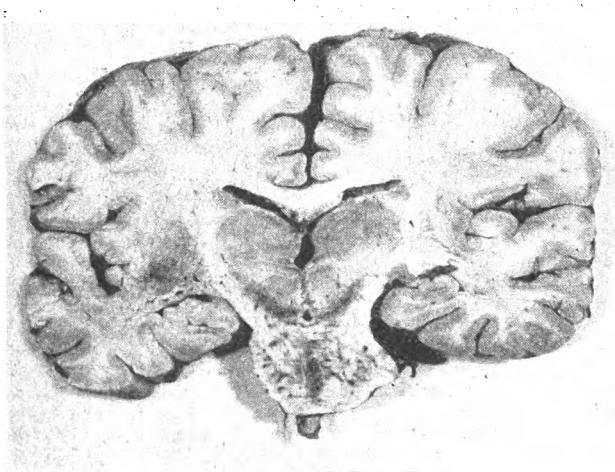

Fig. 1—Section of brain showing pin-point hæmorrhages.

He was given 500 mg. of ascorbic acid, 25 mg. of aneurine once, and nicotinic acid 100 mg. five times, all by injection.

At 9 A.M. next day the blood-sugar was 500 mg. per 100 ml., and he was given 50 units of insulin intramuscularly.

At 12 noon the blood-sugar was 300 mg. per 100 ml. The patient died two hours later of pulmonary œdema.

Necropsy Findings.—Emaciated body, œdema of lungs, heart normal except for some hardening of aortic valves, bilateral pyelonephritis, normal pancreas.

Brain showed many small "flea-bitten" areas, mostly in pons and subthalamic region (fig. 1). Corpora mammilaria were free, but fornix and anterior commissure showed small hæmorrhages.

Histological examination showed gross irregular capillary dilatation, small "ball" hæmorrhages (fig. 2) and also small ring-shaped (fig. 3) hæmorrhages, and some areas of demyelination and perivascular necrosis. These changes are consistent with a diagnosis of Wernicke's encephalopathy.

COMMENTS

The clinical features correspond more closely to the nicotinic-acid-deficiency encephalopathy described by Jolliffe et al.[13] and Sydenstricker[20] than to Wernicke's encephalopathy. Besides the clouding of consciousness, ocular disturbances, and peripheral neuritis, there was cog-wheel rigidity of the extremities. The distinction is probably a fine one, for the morbid anatomical basis is apparently identical. Campbell and Russell[5] suggest that Wernicke's syndrome and the picture described by Jolliffe et al. differ in the intensity of the deficiency of aneurine and of nicotinic acid present.

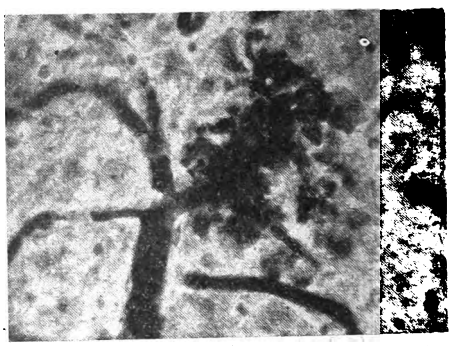

Fig. 2—Portion of brain under high power, showing typical "ball" hæmorrhage. (× 350.)

Neither type has previously been described with hyperglycæmia, and two possibilities must be considered in the case described here—did the encephalopathy develop in a diabetic, or was the hyperglycæmia due to the injury of a hypothalamic area by minute hæmorrhages, corresponding to that produced in animals by Claude Bernard[4] by puncture of the floor of the fourth ventricle?

Diabetes seemed improbable, for an underweight patient with coma would certainly have had thirst and polyuria. The absence of ketones in the urine was not conclusive. Ketones may not be excreted if there is severe renal failure, and their absence may also be explained by an excess of β-hydroxybutyric acid with little acetone or aceto-acetic acid to give the colour reactions.[19] In this patient there was some impairment of the renal function (blood-urea 114 mg. per 100 ml.), and post mortem there was bilateral pyelonephritis, but the Rothera test was negative in the blood-plasma. The possibility of an unusual partition of ketones was not excluded. A further point against diabetes was the absence of lipæmia. The explanation favoured in this case is to attribute the hyperglycæmia to injury of the hypothalamic area by a minute hæmorrhage. It is of interest that there was considerable insulin insensitivity, 850 units being needed to lower the blood-sugar.

The previously reported cases of diabetic coma without ketosis[1–3 6–12 14–17 19 21] have been reviewed, but in only

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one—that of Evans [7]—did it seem likely that a similar pathology was responsible. Unfortunately in that case the clinical data given were scanty and there were no morbid anatomical findings.

This punctuate hæmorrhagic encephalopathy has usually been found associated with alcoholism or with lesions of the alimentary tract which have impaired the absorption of food, and the lesions probably represent a reaction to a vitamin-B-complex deficiency.

It is difficult to explain why this patient should have developed an encephalopathy, but an acute deficiency may have been precipitated by the infection of the foot and

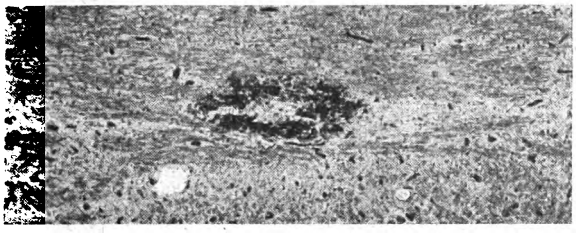

Fig. 3—Portion of brain under low power, showing typical "ring" hæmorrhage. (× 100.)

urinary tract causing increased demands on vitamin-B complex when perhaps no reserves existed. This mechanism has been described in patients after operation.[18]

SUMMARY

A fatal case of Wernicke's encephalopathy is described with a blood-sugar level of 1000 mg. per 100 ml. but no ketosis. It is suggested that the hyperglycæmia was the result of a minute hæmorrhage into the hypothalamus.

Our thanks are due to Dr. W. Pagel for his report on the pathology, and to Dr. Richard Asher for his constructive criticisms.

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"... There can be little doubt that Surgery is facing further change in the relative emphasis placed on the component parts of its content. Science will increase, and scientifically based Technology will slowly replace Empiricism. There are certain to be changes in the organizational patterns formed by Hospital, University, and State. These changes may be brought about by explosive forces in the restless external social order, or anticipated by a sensitive government. Change is to be feared only if those responsible for the preservation of essential values falter in their task. In fact, change is welcomed in so far as it may strengthen the profession to meet the new challenges that confront our civilization. In times of change there is need for wisdom both in the external social order and within the profession. . . . A hold-fast in Science is essential, but this represents only a part of the strength of Surgery. By maintaining the ancient bond with humanity itself through Charity—the desire to relieve suffering for its own sake—Surgery need not fear change if civilization itself survives."—Dr. EDWARD D. CHURCHILL, *Ann. Surg.* October, 1947, p. 381.

DEATH FROM RENAL ANOXIA AFTER MYANESIN ANÆSTHESIA

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HÆMOGLOBINURIA following intravenous 'Myanesin' anæsthesia has lately been reported by Pugh and Enderby.[1] Their patients recovered, but attention was drawn to the possible occurrence of serious renal damage. Earlier in the year we had investigated a death following the administration of myanesin and were of the opinion that the drug might have been responsible; but, since we failed to determine the nature of the illness for which the patient was admitted to hospital, we did not feel justified in reporting the case. The demonstration of hæmoglobinuria attributable to myanesin prompts us to report it now.

A woman, aged 22, gave a history of rheumatic fever three years previously, when she was confined to bed for four months. She was said to suffer from asthma, having had an acute exacerbation two years ago, and was regarded as a semi-invalid, though there was no history of dyspnœa or distress on exertion. The abdominal symptoms, ascribed to appendicitis, for which she was admitted had been present for seven months.

On admission she weighed 54 kg. The respiratory system was normal. There was a systolic murmur, but no cyanosis, clubbing of the fingers, congestion, or œdema. She could hold her breath only 15 sec., but she was very nervous on examination. Her pulse-rate was 100 per min. The urine had a specific gravity of 1·024 and contained a trace of reducing substance but no albumin.

Operation (Feb. 18, 1947): appendicectomy and pelvic exploration. The appendix was not diseased. Anæsthesia: 8.30 A.M. 'Nembutal' gr. $1^1/_2$ (100 mg.) by mouth; 9.30 A.M. 'Omnopon' gr. $^1/_6$ (11 mg.) and scopolamine gr. $^1/_{300}$ (0·22 mg.) intramuscularly; 10.30 A.M. thiopentone 250 mg. intravenously, followed by nitrous oxide and oxygen by the semi-closed method. Myanesin 13 ml. (1·3 g.) was given intravenously just after the incision was made. Relaxation being unsatisfactory, two further doses of 5 ml. and 10 ml. were given during the operation, making a total of 28 ml., equivalent to about 56 mg. of myanesin per kg. Pulmonary ventilation remained adequate, and the patient's colour was good throughout the operation, but considerable cardiovascular depression developed 10 min. after the third dose of myanesin, and the systolic blood-pressure fell to 70 mm. Hg. The patient was kept under observation in theatre for half an hour after the end of the operation, by which time the systolic pressure had risen to 95 mm. Hg.

Postoperative Course.—The patient vomited several times on the day of operation, and continued to vomit for next four days. On Feb. 22 hæmaturia was noted. On the 23rd she had a series of epileptiform convulsions. Her blood-pressure was 140/90 mm. Hg and the blood-urea 290 mg. per 100 ml. Hæmaturia continued. A catheter specimen of urine taken in the evening had a specific gravity of 1·010 and an alkaline reaction; it contained numerous blood-cells and some granular casts. Pulmonary œdema developed during the day and became rapidly worse, and the patient was comatose by the evening. She died on the morning of Feb. 24.

Necropsy.—A well-nourished well-built young woman 156 cm. in length, with some cyanosis, no œdema, and no cutaneous hæmorrhages. There were numerous minute hæmorrhages in the connective tissue between the muscles of the chest wall anteriorly. A few small recent hæmorrhages were also present in the mediastinum and alongside the epicardial veins on the posterior aspect of the heart. The appendicectomy wound was healing well, and the abdominal cavity was apparently healthy. The heart weighed 320 g. (slightly above average), but there was no apparent hypertrophy of any of the chambers, and the valves and coronary vessels appeared normal. There were no endocardial hæmorrhages. The aorta and large arteries, including

1. Pugh, J. I., Enderby, G. E. H. *Lancet*, Sept. 13, p. 387.

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the renal arteries, were entirely free from atheroma, and the venæ cavæ and large veins contained no thrombi but were considerably distended with blood. The renal veins appeared entirely healthy except for some distension. The air passages contained frothy fluid, and the lungs were extremely œdematous, with a few recent intra-alveolar hæmorrhages but no gross or histological evidence of infection. The liver and spleen were acutely congested. Examination of the shaft of the right femur revealed active red marrow throughout its whole length. Histologically this marrow showed active erythropoiesis and a rather large number of megakaryocytes. No abnormal cells were seen.

The kidneys were much swollen, each weighing 170 g. The capsule of each stripped easily, leaving a perfectly smooth pale grey surface. On section the two kidneys were identical and had a striking appearance. The cortex was leaden grey, looking almost necrotic, and was evidently œdematous. There were no hæmorrhages in the cortex but some streaks of fresh hæmorrhage in outer zone of medulla, which was darker in colour. The renal pelves showed some petechial hæmorrhages but were not dilated or hyperæmic. The ureters appeared normal. The bladder was empty and showed some groups of recent hæmorrhages above and external to each ureteral orifice. There was no sign of infection of the bladder.

Histologically the kidneys showed much interstitial œdema but no cellular exudate. The glomerular capillaries contained little or no blood, but the afferent arterioles were uniformly dilated. There was no evidence of any arterial or arteriolar damage. All the convoluted tubules, the loops of Henle, and the collecting tubules were considerably dilated. The collecting tubules contained brownish granular material, much of which was present in the form of brownish ribbon-like casts. In places these casts were impacted in the tubules; at these sites there was some necrosis of the lining epithelium, and in one place a tubulovenous anastomosis was seen. The general appearance was that found in various conditions of the renal anoxia. There was no evidence of any antecedent renal lesion.

Histological examination of other organs showed no evidence of hypertensive vascular disease. The endocrine organs showed no change from normal.

DISCUSSION

This girl had never done any heavy work and was regarded as an invalid by her parents. Her rheumatic fever left no recognisable changes in the heart, and the clinical diagnosis of chronic appendicitis was disproved at operation. The only positive finding at necropsy that could have been present before the operation was considerable hyperplasia of red bone-marrow in the femur. No free iron was demonstrable in liver or spleen, and there was no history of jaundice; hence, with no hæmatological examination before death, the nature of the underlying blood disorder could not be determined.

Since the presence of hæmaturia was proved by microscopic examination of the urine during life, one cannot attribute the necropsy finding of brown debris in the renal tubules to intravascular hæmolysis. Hæmoglobinuria may or may not have been present. The important point is that the renal changes were those common to the numerous conditions attributed by Maegraith et al.[2] to renal anoxia. The presence of blood pigment blocking the tubules is to be considered a secondary factor, contributing in some degree to the renal embarrassment but not an essential part of the syndrome.

Intravascular hæmolysis, as in incompatible blood-transfusion, is one of the possible causes of peripheral vascular failure and so of renal anoxia; it is not necessarily accompanied by clinical jaundice. Now that hæmoglobinuria has been reported in association with myanesin anæsthesia, we feel justified in concluding that this anæsthetic was responsible for the fall of blood-pressure and thus for the renal changes. Since we were unable to determine the nature of the illness that led this patient to seek advice we cannot say to what extent it may have contributed to the fatality.

2. Maegraith, B. G., Harvard, R. E., Parsons, D. S. *Ibid*, 1945, ii, 293.

SUMMARY

A postoperative death from uræmia is reported with necropsy findings similar to those in incompatible blood-transfusion.

Reasons are advanced for ascribing the renal changes to the use of myanesin as an anæsthetic.

We are indebted to Mr. H. J. Croot, F.R.C.S., for permission to use his clinical notes.

BILATERAL ZOSTER

REPORT OF A CASE

E. W. PROSSER THOMAS
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BILATERAL herpes zoster is extremely rare. Epstein and Jacobson in 1936 traced only 46 reported cases and they added 2 of their own. Subsequently, 1 case each has been reported by Rattner (1938), Ambler (1939), and Fourestier (1939).

In bilateral zoster the lesions may appear at the same level on the two sides, but in most recorded cases they have been at different levels. The onset may be simultaneous on the two sides, or the second zoster may be delayed for a day or longer. The bilateral disease seems to have more severe prodromal symptoms than ordinary zoster. For example, Rattner's patient had dizziness, fever, vomiting, and severe headache for some days before the eruption appeared. In Ambler's case, in which both sides of the neck were involved in the distribution of the 4th cervical nerves, there was a sudden onset with malaise and fever (104°F), the eruption developing twenty-four hours later. Epstein and Jacobson, however, doubt whether on the average the prodromata are any more acute than in ordinary zoster.

The dorsal nerves are said to be most often involved in bilateral zoster, and then the cervical nerves (including the brachial plexus). There seems to be no particular tendency in bilateral disease for the eruption to be severe or for recovery to be delayed.

A married woman, aged 33, was admitted to hospital with lower abdominal pain of four days' duration. The pain began in the umbilical area and later became generalised all over the abdomen. It was constant, with periodical exacerbations, which the patient likened to labour pains. Menstruation had begun at about the same time and was somewhat heavier than usual.

She had 2 children, who were well, and had had 4 miscarriages—1 at six weeks and 3 at seven months.

On admission she described the whole abdomen as feeling bruised. There was tenderness in both iliac fossæ and some guarding on the left side, with release pain. On vaginal examination a mobile anteverted uterus was felt, and there was tenderness and a suggestion of induration in the posterior fornix. The adnexa were not palpable. There was no psoas sign. Her temperature on admission was 99°F but was normal thereafter, as was her pulse-rate. No definite diagnosis was made, but salpingitis was suspected.

Within two days of admission the abdominal pain had subsided; but she complained of an ache in the small of the back. A rash then appeared in this area (about six days after the onset of the illness).

The eruption was a bilateral herpes zoster of mild but typical appearance. Groups of tiny pearly close-set vesicles on an erythematous base were distributed at about the same level on both sides in the upper sacral area and extended outwards over the hips and upper part of the buttocks. Some of the lesions on the left side were abortive, consisting only of patches of slightly raised erythema. The upper inguinal lymph-nodes on both sides were enlarged and tender. The lower lumbar spine was tender on pressure. Radiography of the lumbar spine showed no bone or joint disease.

The patient was treated with injections of 'Pitressin,' 0·5 ml., twice daily for three days. The herpes blisters dried

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without secondary infection, the lumbar neuralgia subsided, and the patient was discharged well about a week later.

I am indebted to Mr. Douglas MacLeod for permission to publish this case.

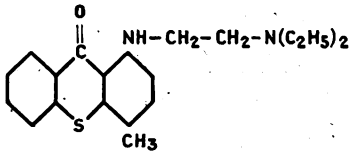
REFERENCES

Ambler, J. V. (1939) *Arch. Derm. Syph., Chicago*, 39, 706
Epstein, E., Jacobson, H. P. (1936) *Ibid*, 34, 989.
Fourestier, M. (1939) *Pr. méd.* 47, 1055.
Rattner, H. (1938) *Arch. Derm. Syph., Chicago*, 38, 436.

Preliminary Communication

THE EFFECT OF MIRACIL D ON HUMAN SCHISTOSOMIASIS

'MIRACIL D' is the hydrochloride of 1-methyl-4-beta-diethyl-aminoethylaminothioxanthone.



It was synthesised by Mauss and was shown by Kikuth and Gonnert to have considerable therapeutic activity for mice and monkeys infected with *Schistosoma mansoni*.[1] According to them, mice are cured—i.e., worms killed—with six doses of 60–120 mg. per kg., and monkeys are cured with two doses of 5 mg. per kg. After the occupation of Germany this compound was further studied in England. The pharmacology in small animals has been described by Wood,[2] and methods for estimation in the body fluids have been described by Latner et al.[3]

The pharmacology and toxicology in monkeys and man have been studied by two of us (F. H. and W. F. R.). The compound is administered by mouth, since it is more toxic, or causes more local irritation, if injected intravenously or intramuscularly. Monkeys tolerate 200 mg. per kg. four times a week. In man it is apparently rapidly absorbed from the alimentary canal, and $2^1/_4$ hours after single doses of 0·2 g. the concentration in the blood rises to about 1 mg. per litre. Over 90% of miracil is degraded in the body, and only about 7% is excreted in the urine. There is little tendency for it to accumulate in the body. The concentration in the plasma is about twice that in the red blood-cells; the concentration in the leucocytes is probably much higher. In animals deliberate long-continued overdosage may produce degenerative changes in the liver and the renal tubules, but these are usually less than would be expected. In man the maximum tolerated dose for repeated administration is about 0·2–0·3 g. a day. In healthy British volunteers overdosage produced nausea and general prostration; insomnia and yellow discoloration of the skin and sclerotics also occurred. These symptoms came on after a latent period of about a day. Apparently they were not due to a direct action on the alimentary canal but rather to the formation of some degradation product of miracil.

CLINICAL TRIALS

By the kindness of the Southern Rhodesian Public Health Department it has been possible to carry out clinical trials at Salisbury.

Methods.—The patients were arranged in four groups. Group I, consisting of 3 African men, received 14 doses of 200 mg. Group II, consisting of 9 African schoolboys, received 12–13 doses of 100 mg. followed by 12–13 doses of 300 mg. Group III, consisting of 13 African schoolchildren, received 18–22 doses of 200 mg. Group IV consisted of 17 Eurafrican children; 6 larger boys received 19 doses of 200 mg., and 11 smaller children received 6 doses of 100 mg. and 13 doses of 200 mg. The compound was administered as uncoated tablets, once daily after the midday meal, for six days a week; preliminary doses of 50 mg. were given to each patient, to exclude idiosyncrasy, before the above courses were begun.

At the start the patients were passing viable ova of *S. hæmatobium* or of *S. mansoni*; but, apart from hæmaturia in a few of them, they were not suffering from any obvious disability as the result of their infection, and they seemed all vigorous healthy subjects. All but 3 of the patients infected with *S. mansoni* were also infected with *S. hæmatobium*. The patients were examined at intervals of four to seven days during treatment, and then at fortnightly intervals for two months after the last dose.

Results.—Immediately after the cessation of treatment 6 of 41 patients with *S. hæmatobium* infection, and 2 of 12 with *S. mansoni* infection, were no longer passing eggs. At the end of four weeks 11 of 41 with *S. hæmatobium* infection, and 4 of 12 with *S. mansoni* infection, were no longer passing eggs. At the end of eight weeks 9 of 40 with *S. hæmatobium* infection, and 2 of 11 with *S. mansoni* infection, were no longer passing eggs. One patient with a double infection was not examined.

The criterion of a case being negative was the absence of eggs on microscopical examination. Thus 22% of patients with *S. hæmatobium* infection and 18% of patients with *S. mansoni* infection became negative eight weeks after the treatment ceased.

DISCUSSION

Most of the patients who ceased passing eggs had been only lightly infected; so too much significance should not be attached to them. In some the cessation of egg-passage during the three-month period of observation may have been spontaneous. In some the passage of eggs ceased during the period of observation but eggs were found again at later examinations. It is concluded that in this clinical trial the therapeutic action of miracil D, if any, was slight.

Possibly the drug was responsible for cure in some of the cases, but this cannot be proved. Certainly the great majority of the patients continued to pass living ova after these courses of treatment, which are considered to be about the maximum tolerated. Even on the most favourable interpretation of the results the therapeutic effect of miracil D was greatly inferior to that usually exerted by antimony preparations, and it was not great enough to be of any practical value.

These courses of miracil were well tolerated by most of the patients. One man in group I had intense nausea, anorexia, and weakness for several days at the end of the course; these symptoms may have been due to miracil. Two others had slight or moderate nausea. Various boys reported slight abdominal pains when questioned, but these are common among African children and are probably not significant. There were no significant alterations in the hæmoglobin or white-cell counts during and after treatment. One European (not included in the results recorded above) became distinctly yellow in the conjunctivæ and skin while taking miracil, but he had no other symptoms; eight weeks after treatment he still continued to pass occasional viable eggs of *S. hæmatobium*.

Details of these investigations will be published in the *British Journal of Pharmacology and Chemotherapy*.

SUMMARY

Miracil D is a new compound which has been reported to be therapeutically active for infections of mice and

1. Combined Intelligence Objectives Subcommittee (1945) File no. xxv, vol. 54; British Intelligence Objectives Subcommittee (1946) Final report, vol. 116.
2. Wood, D. R. *Quart. J. Pharm.* 1947, 20, 31.
3. Latner, A. L., Coxon, R. V., King, E. J. *Trans. R. Soc. trop. Med. Hyg.* 1947, 41, 133.

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monkeys with *Schistosoma mansoni*. It was given in maximum tolerated dosage for three weeks to 42 African and Eurafrican patients infected with *S. hæmatobium* (38 cases) and/or *S. mansoni* (11 cases). The results were disappointing. Two months after the end of treatment, 86% of the patients were still passing living ova.

In this series of cases the therapeutic effect of miracil was not great enough to be of real clinical value.

Grateful acknowledgments are due to the Medical Director, Southern Rhodesia, for clinical facilities and encouragement; to all the workers mentioned above for information about their results and for material; and to the volunteers who made possible the study of the pharmacology of miracil in man.

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Reviews of Books

British Surgical Practice

Vol. I. Editors: Sir E. ROCK CARLING, F.R.C.S., F.R.C.P., consulting surgeon, Westminster Hospital; J. PATERSON ROSS, M.S., F.R.C.S., surgeon and director of surgical clinical unit, St. Bartholomew's Hospital, professor of surgery in the University of London. London: Butterworth. 1947. Pp. 536. 60*s*.

THE publication in this country of a comprehensive new textbook of surgery is a notable event. The last big book of this kind published in Great Britain was Maingot's *Post-graduate Surgery*, but the rapid advances of the past ten years have dated it, and have made its great predecessor, Choyce, seem positively old-fashioned. The time was ripe for the appearance of *British Surgical Practice*, the first of the eight volumes of which has now appeared, and Sir Ernest Rock Carling and Prof. Paterson Ross, as general editors, have collected round them a distinguished team of contributors.

The work is intended as a guide for surgeons who have no easy access to libraries, being written neither for the expert in any particular specialty nor for the undergraduate. Operative technique is described in detail, but operations which are no longer regularly employed have been excluded. The old regional grouping has been discarded, and the sections substituted are instead arranged alphabetically. Thus, vol. I contains 45 sections, starting with abdominal emergencies and ending with the autonomic nervous system. Almost every section is by a different author, each an accepted authority in his own sphere. The book is beautifully printed, illustrated, and bound, and each volume has an index. A comprehensive index is to be published, at the end, as a separate volume to cover and cross-reference the other volumes.

The sectional arrangement is thought to make for easy reference; but how it will work out can scarcely be judged until the book has been used on the day-to-day problems of practice. The editors must have had some trouble to decide the headings and scope of each section, and to avoid undue dissection and separation of subjects: one section, for example, is entitled "Anus, artificial (management)", and one wonders why this matter is not dealt with where the operation of colostomy is described; and the operation of tracheotomy, details of which might be required in a hurry, is described under "Air Passages." The comprehensive index no doubt will overcome such difficulties as these, but it is evident that the sectional alphabetical arrangement brings its own problems.

In these days of rapid progress and rapid change of fashion in surgical thought, the bound volume is at a disadvantage: parts of it are out of date almost as soon as printed. *British Surgical Practice* is to be kept up to date by the publication of an annual supplement—in some ways a less satisfactory solution than the production of a new edition, but necessary when a new edition costs £25 a set.

There are many valuable articles in this first volume, and little to criticise. One or two of the sections might have been telescoped: acidosis scarcely merits 7 pages and could have been included in a later section on dehydration and chloride deficiency following operations. The section on the abdominal wall is concerned purely with the surgical anatomy of incisions and their repair: good as it is, it should surely also say something about the diseases affecting this region. Achlorhydria cannot easily be discussed apart from the stomach, and the section on adiposity would have been more useful if some specimen menus had been included. These are small things to set against such articles as those on abscess (Prof. Geoffrey Hadfield), amputations (Mr. George Perkins), acute appendicitis (Mr. Wardleworth Nuttall), and arthritis (Mr. Norman Capener). Those who possess the first volume will be eager to see its successors.

Textbook of Pathology

(6th ed.) E. T. BELL, M.D., professor of pathology, University of Minnesota. London: H. Kimpton. 1947. Pp. 910. 50*s*.

Two years after the last, the sixth edition of Bell's well-known textbook is presented from the department of pathology in the University of Minnesota, with Professors Clawson and McCartney contributing as before. The text is concise rather than discursive, and the student must needs remember most of what he reads. The large majority of the key references at the end of each section are, understandably, to the American literature. The book has been well revised, with only slight increase in size, but although the blood-level for severe ethyl-alcohol intoxication has been reduced from 0·4% to 0·3% in this new edition the amount "considered sufficient to cause death" remains at the high value of 1% (0·5% according to Glaister and Jetter). In Professor Bell's experience "the chronic drunkard has a large fatty liver, seldom with cirrhotic changes"—a contrast to the findings of many other American writers. The book is good and comprehensive; in a future edition the remaining drawings could well be replaced by photomicrographs.

Curare

Its History, Nature, and Clinical Use. A. R. MCINTYRE, M.D., PH.D., professor of physiology and pharmacology, University of Nebraska. London: Cambridge University Press. 1947. Pp. 240. 27*s*. 6*d*.

THIS book surveys past and present knowledge of the use of curare in all its aspects, and includes a comprehensive bibliography. Although investigated over several centuries curare has only recently been used in clinical medicine for the control of tetanus and other convulsive states; and now that a standardised preparation is available the clinical applications have multiplied rapidly. It promises well as an adjuvant in anæsthesia, inducing muscular relaxation in the lightly anæsthetised patient. The glowing reports from experts may, however, lead the inexperienced into using it in a thoughtless or too light-hearted manner. Bronchospasm is among the possible dangers, and abolition of respiration among its peripheral actions. More important is the fact that it also has a central action which may be induced by a heavy initial dose or by prolonged curarisation.

A Short Textbook of Surgery (4th ed. London: J. & A. Churchill. 1947. Pp. 680. 30*s*.).—This edition, though shorter by a few pages than its predecessor, includes entirely new sections on arterial injuries, dysphagia, and rehabilitation. Many chapters have been completely rewritten, all have been brought up to date, and 26 new illustrations have been added. It is inevitable that where space is rigidly economised many controversial subjects must be treated somewhat scantily, but on the whole Prof. C. F. W. Illingworth has preserved a skilful balance, and has avoided dogma. Some of the illustrations should be either improved or dispensed with—e.g., the one showing investigation of an inguinal hernia by invaginating the scrotum, and that depicting injection of a pile into the centre of its substance. The book as a whole, however, is sound and useful.

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THE LANCET

LONDON: SATURDAY, DEC. 20, 1947

The Issue

THE Negotiating Committee's long-awaited statement is brilliant but a little disappointing. Instead of discussing how best the National Health Service Act can be made to work, they seem to have spent the past nine months in elaborating the case for its amendment. Nevertheless the documents released this week broadly fulfil the prediction made last spring that the controversy would narrow down to a single major issue—whether doctors joining the service should continue to own the goodwill of their practices. The majority of the committee are convinced that they should do so: "the ownership of goodwill," they aver, "is regarded by the medical profession as fundamental to its freedom." They have therefore endeavoured to deflect the Minister from his purpose by proving that abolition of the sale and purchase of practices is unnecessary and that (as the Act now stands) it might cause grave hardship and grave injustice.

First, then, is abolition necessary? The ostensible reason for insisting on it immediately is that in the National Health Service the Minister is expected to ensure that medical resources are distributed throughout the country in accordance with needs: it will be impossible to do this so long as doctors are able to buy practices wherever these are vacant, for in so doing they tend to concentrate in the pleasanter or more lucrative areas. This argument the Negotiating Committee counters by saying that when the same medical payment is to be had in respect of every person in the country the doctors will tend to concentrate on previously under-doctored areas where they are likely to collect more capitation fees; and so far as necessary they can be attracted to specially unpleasant or sparsely populated districts by the offer of additional payments. The Minister does not dispute this favourable tendency; but he thinks "it cannot be assumed," especially when doctors are scarce, that it will result in their distribution according to population. In so far as the committee is right, and defects in distribution will automatically be corrected in a service providing payment for every citizen, the need for interfering with the present method of filling practices by purchase is diminished. And as distribution improves there will be correspondingly less need to invoke those powers of "negative direction" to which so much exaggerated objection has been taken. The Minister is justified in claiming that power to close a vacant practice in an over-doctored area is necessary if he is to be sure of carrying out his duties: and, as he remarks, it is unusual to insist on receiving publicly remunerated work—as a school-teacher for instance—wherever one chooses to do it. But we should all prefer to see such powers kept in the background, and the creation of a fund of about £400,000 a year for positively attracting doctors to unpopular areas should do much to that end.

On the effects of the Act, the committee put up an impressive case in favour of their opinion that "abolition of the custom of buying and selling practices creates more problems than it solves." Certainly many doctors who were otherwise prepared to surrender the goodwill of their practices—in return for compensation at an average figure of over £3600—have been alarmed at the complex penal clauses by which the lawyers have tried to prevent circumvention of the Act. Their fears will be increased by the committee's picture of chaos created by ambiguities of wording and by uncertainty whether partnership agreements will stand after the appointed day; and particularly by the examples of difficulties that may arise over the apportionment of compensation and interest, the sale of houses, and the appointment of assistants. By all this recital, however, the Ministry remains apparently unperturbed: it holds that in general the problems can be solved by appropriate regulations, and that the exceptional case can be met by partners varying their agreements to fit the new circumstances. Nobody will deny that the difficulties exist; but "hard cases make bad law." Perhaps, too, the committee would have found the difficulties less formidable if they had shared the widespread opinion that discontinuance of the sale and purchase of practices is in itself a good thing, worth pursuing at the cost of temporary inconvenience. To the Government, to a large proportion of the public, and to a great many doctors the sale of practices is an anachronism comparable to the sale of commissions in the Army: more, it is a manifestation of the commercialism which has infiltrated medicine with deplorable consequences and which we are anxious to reduce. To a majority of the committee, however, it remains a cause worth fighting for.

Nor is their argument negligible by any means. First, the desire to increase the capital value of a practice is an incentive to good and keen work. (But so, to some extent, is the desire to increase income and pension.) Secondly, ownership of goodwill provides a basis for coöperation between practitioners. (But, as the Minister says, there seems to be no reason why the buying and selling of shares should be regarded as the essence of a medical partnership.) Thirdly, and more important, so long as a man has a practice which is his own, in the sense that he can sell it, he has a feeling of professional independence. He is like the employee with private means who can snap his fingers at his employer: he is a sovereign State with a medical service of his own. True, the goodwill of his practice does not really give him much more security than an equivalent balance at the bank or in the Treasury; but in either case he has an advantage over the young doctor entering the National

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Health Service with neither one nor other. If the practitioners of the future are not to enjoy the private security of a saleable practice they must be given a high degree of public security—the certainty of fair treatment with no possibility of being victimised for holding heterodox or unwelcome opinions. The penalty of removal from the service will become increasingly severe as the possibilities of private practice contract, and it is a sound instinct which has led the profession to ask repeatedly that the final decision on removal shall be made in a law-court and not at the Ministry. The Minister has not got over this difficulty by his offer to consult another advisory body; but conceivably a way out is indicated by his remark that an aggrieved doctor can go to the courts on the grounds of unlawful action. If after failing to convince the medical services subcommittee (set up by the local medical committee and the local executive council), the tribunal, and the Minister with his advisory committee, a practitioner is still able, under the Crown Proceedings Act, to sue the Minister for wrongful dismissal, may we not be satisfied? The answer is yes—but only if members of the service remain perpetually alert in the cause of professional freedom and ready to defend it at all levels. As with so much in this service, the remedy here lies with ourselves. Whatever the Negotiating Committee may say, the proposed organisation offers the profession great opportunities of influence, and these opportunities will further increase if they are well used. Whether the service is good or bad depends chiefly on what we choose to make it. The spirit is far more than the letter.

This rôle of doctors in shaping the service is not something potential which we have merely imagined: it is an extension of something already begun. On regional hospital boards and local executive councils many medical men and women have begun to play their part, and they have discovered that decentralisation of responsibility under this Act is a reality—that the tasks offered them are anything but trivial. In the vast reorganisation of hospitals which is now in progress, the medical profession is already deeply involved. All of which takes us back to a brief paragraph at the beginning of the Negotiating Committee's statement which admits that certain parts of the Government's scheme are commended or accepted by the profession, including the proposed planning and development of hospital services on regional lines, the general structure of local executive councils, and the principle that the service should be available to the whole community. This paragraph is in fact more significant than any that succeed it; for it virtually buries the possibility that the profession will in the end refuse to take part in the National Health Service—though concessions may be necessary before it commits itself. The only big question which remains to be decided is whether general practitioners are prepared, on entering the service, to surrender the goodwill of their practice in the manner laid down under the Act. The scale of compensation long ago arranged, and the range of remuneration now offered, are reasonable without being lavish; and, though the new proposals would probably increase the income of a large number of practitioners and would make things much easier for new entrants to practice, they are not so dazzling as to blind anyone to a vital principle. Is the ownership of goodwill really a vital principle? Is the Negotiating Committee right in thinking that it is "in the best interests of the public and the profession" that general practitioners should retain it? These are questions on which we shall all have to make up our minds. But even if the profession decides that the Minister's proposals about goodwill are unsound or intolerably vexatious, this need not necessarily mean that the general-practitioner service cannot be started next July. Rather than face a postponement which would be highly inconvenient to the profession as well as the Government it would be possible to bring the Act into operation without applying those sections which alter the present methods of filling vacant practices. In this way the difficulties now arising through the shortage of time could be overcome, and the legal situation could be more fully explored. Preferable as it would be to a paralysing dispute, this expedient might nevertheless (as the committee said of abolition) create more problems than it would solve—especially for the many younger men who have lately taken on large commitments. We sincerely trust therefore that it will not have to be considered.

Mr. ANEURIN BEVAN is a controversial figure who attracts accusations. He is accused of deceiving the Negotiating Committee in that he was never really prepared to submit an amending Bill to Parliament before the Act was tried. He is accused of using a politician's guile to divide the profession, because he seems to listen rather more readily to the spokesmen of specialists than to the spokesmen of general practitioners. He is accused of a failure in political wisdom because, when he feels sure of his position, he does not allow his opponents to capture those minor trophies without which they cannot comfortably reappear at home. An outstanding Parliamentarian, the Minister may in fact have faults as a negotiator. Two things, however, must be said in his favour: he has already been proved right in his bold solution of the almost insoluble problem of the hospitals; and he has also—on paper at least—been consistently conciliatory and reasonable in his pronouncements of the past year. In one sentence only of this week's memorandum does he react to the tone used by the Negotiating Committee—when he says that hardly any major step to better social services has provoked more misstatements or misunderstandings than his Act. Not everyone would agree that this is so, but none can deny that the less attractive features of the National Health Service have had disproportionate emphasis. The Negotiating Committee has of course good reason to claim that "the medical profession itself has provided the main impetus towards the establishment of a comprehensive health service"; but the cautious attitude of the profession has been such that in the eyes of the public it has seemed to oppose all schemes for such a service, from the Coalition's white-paper onwards. Certainly among doctors the result of this caution has been a widespread feeling of dissociation from a reform which, though it goes farther and faster, embodies what the profession has long demanded; and errors on both sides have unhappily created the

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mentality of the conscript in men who ought to be volunteers. Fortunately it is not too late for a change of attitude. The Minister's new appeal for genuine and willing coöperation is one that must not go unanswered, for the opportunities of this early stage of the service are opportunities that will never recur.

Pandemic Diphtheria

THE extent to which diphtheria became pandemic during the late war is not generally realised. STOWMAN,[1] consultant epidemiologist to the World Health Organisation Interim Commission (WHOIC), estimates that in Europe, excluding the Soviet Union, Poland, and the Balkans, for which data are either absent or inadequate, there were soon after the war began not less than 600,000 cases a year, and that the total deaths for the war and immediate post-war years probably exceeded 150,000. The pandemic is now receding, but in 1946 the cases reported in this area numbered 336,000, which is still two-thirds of the peak incidence.

When the war broke out Germany differed from the neighbouring countries in having a diphtheria incidence which had been steadily rising for nearly fifteen years. Inoculation against diphtheria was not compulsory for German children, nor was it being practised in Germany on a big enough scale to offset the increased risks of infection arising from the extensive development of community life, particularly among young people. The main focus of epidemic diphtheria in Germany, then as now, was the North Sea area—i.e., Hanover, Schleswig-Holstein, and Berlin. It was probably from this focus that a wave of high diphtheria incidence spread when the German armies broke through on all sides in the spring of 1940. Sweden and Denmark managed to resist this epidemic wave to some extent, but Norway and Finland suffered severely, as did the Netherlands, where an epidemic promptly appeared on the heels of the invaders and with them reached Belgium and France, also spilling over slightly into neutral Switzerland. In several ways our own position during these momentous events was exceptional. In the first place the United Kingdom was not at the outbreak of war an area of low incidence, the median of cases reported annually from 1928 to 1938 being about 75,000. Then communications with the Continent were almost completely interrupted in four of the war years, and the efforts of an energetic public-health service pursuing a well-organised campaign of child immunisation apparently built up a substantial resistance to diphtheria by the time communications were reopened in 1944. England, Scotland, Wales, and Northern Ireland went through the war without any epidemic of diphtheria, and by 1946 the annual incidence of confirmed cases had fallen to 16,000, less than a quarter of the 1928–38 median. Eire, where no extensive immunisation of the child population was carried out during the early war years, had a very different experience, with a peak incidence of diphtheria in 1944 three or four times the incidence in 1941. Mediterranean Europe, and North and South America, escaped the pandemic altogether. The resistance of Mediterranean Europe and the Latin American countries, unlike that of the United States and Canada, cannot be claimed as a result of artificial immunisation and must be ascribed to the unknown factors which have for a long time made these areas unfavourable to the spread of diphtheria. In the Pacific area, where Japan with a rising pre-war incidence seems to have played a part resembling that of Germany in Europe, there was an epidemic in the invaded Philippines and a substantially increased prevalence, reaching a peak in May–July, 1946, in New Zealand.

Denmark was almost the only affected country in which the epidemic wave was carefully studied. MORTENSEN [2] has shown that in Copenhagen between 1939 and 1945 there was a striking change in the age-distribution of diphtheria cases; of the recent admissions to hospital only a third were children as against three-quarters in pre-war years. Immunisation in Denmark did not begin until 1941, but in Copenhagen the campaign was very successful and as many as 95% of the children were inoculated. Nevertheless in 1944 that city had 1754 cases of diphtheria, compared with only 41 in 1942. Typing studies showed that the outbreak in 1944 was caused chiefly by gravis strains of *C. diphtheriæ*, which appeared to have a greater capacity than mitis strains for breaking down the defence conferred by inoculation and were associated with a high case-mortality rate in the uninoculated.

Large-scale international studies of global epidemiology require reliable national data collected in a uniform manner. In Sweden, where diphtheria carriers as well as cases are notified, the reporting of about equal numbers in the two categories suggests that an attempt should be made to reach some international agreement on the definition of a diphtheria case. It is already evident that information on the number of cases and deaths will need to be supplemented by data regarding prevailing types of infection, the age-incidence, and the state of inoculation of the population at risk, before the maximum possible control of diphtheria can be achieved.

Synthesis of Vitamin A

NEARLY twenty years ago VON EULER et al.[3] reported that carotene possesses the physiological activity of vitamin A; and soon afterwards MOORE [4] showed that animals are capable of converting this yellow plant pigment into the colourless vitamin. The chemical investigations of KARRER et al.[5] confirmed that vitamin A is a carotenoid derivative, and indicated that it is an alcohol with a molecular weight about half that of the parent hydrocarbon. KARRER's structural formula, consisting of a terpene-like β-ionone nucleus joined to a polyene side-chain with a terminal hydroxyl group, has been accepted by all subsequent investigators.

Despite this relatively simple structure, the vitamin has proved difficult to synthesise, largely because of its sensitivity to oxidation and its general chemical instability. Both KARRER and HEILBRON, with their respective schools, have done valuable exploratory

1. Stowman, K. *Epidem. vit. Stat. Rep. W.H.O.I.C.* 1947, 1, 60.
2. Mortensen, V. *Acta. med. scand.* 1946, 125, 283.
3. von Euler, H., von Euler, B., Hellstrom, H. *Biochem. Z.* 1928, 203, 370.
4. Moore, T. *Lancet*, 1929, ii, 830.
5. Karrer, P., Morf, R., Schöpp, K. *Helv. chim. Acta*, 1931, 14, 1431.

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work. The first claim to have synthesised the vitamin was made in 1937 by KUHN and MORRIS [6]; but their product was admittedly impure, and the synthesis appears to have been neither exploited by themselves nor confirmed by others. Later the synthesis of a derivative of vitamin A, in the form of the corresponding methyl ether, was reported by KIPPING and WILD,[7] but again confirmation was lacking. ISLER et al.[8] have also claimed the synthesis of the same ether by a different route, and have found it to have biological activity. MILAS [9] has apparently synthesised several biologically active ethers and esters, and also the vitamin itself in impure form. Since all his products were somewhat inferior to the natural vitamin in their biological activity he concluded that they contained a high proportion of *cis* isomers. These modifications differ from the natural *trans* isomer in having their polyene side-chain bent back upon itself instead of straight, presumably with a considerable reduction in biological activity.

Another claim to have synthesised vitamin A, this time by a novel and interesting procedure, has recently been made by the young Dutch chemists, VAN DORP and ARENS.[10] With β-ionone as a starting-point they obtained by a well-established procedure the C_{18} ketone corresponding to vitamin A. This compound was then treated with ethoxyethylene magnesium bromide to add four more carbon atoms, and the resulting C_{22} ketone was partially hydrogenated, and rearranged and hydrolysed by treatment with hydrochloric acid to form vitamin-A aldehyde. This product was spectroscopically identified with vitamin-A aldehyde as obtained by oxidation of the natural vitamin; and it was reduced by treatment with aluminium isopropoxide to yield vitamin A itself, though not yet in a pure state. Whether the method is suitable for exploitation on a large scale remains to be decided: there should at least be no shortage of the starting material, β-ionone, which can be readily extracted or prepared from vegetable sources. Even on a laboratory scale, however, a successful and indisputable synthesis of vitamin A in pure and stable form would fulfil an ambition long cherished by organic chemists, and confirmation of the new work will therefore be awaited eagerly. Meanwhile the claim made by the Dutch workers [11] to have synthesised the acid corresponding to vitamin A may perhaps be still more interesting to those studying the vitamin from a biological angle. This acid appears to have a potency equal to that of vitamin A when it is administered orally as the sodium salt.[12] It is said to differ in two ways from all other substances having vitamin-A activity: (1) even large doses do not give rise to storage of vitamin A in the liver [13]; and (2) subcutaneous injections of the sodium salt are only slightly inferior in biological activity to the same doses given orally. These two findings, if confirmed, will have bearings both on our knowledge of vitamin-A metabolism and on vitamin-A therapy in diseases where intestinal absorption is impaired.

6. Kuhn, R., Morris, C. J. O. R. *Ber. dtsch. chem. Ges.* 1937, **70**, 853.
7. Kipping, F. B., Wild, F. *Chem. Ind. Rev.* 1939, **58**, 802.
8. Isler, O., Kofler, M., Huber, W., Ronco, A. *Experientia*, 1946, **2**, 31.
9. Milas, N. A. *Science*, 1946, **103**, 581.
10. van Dorp, D. A., Arens, J. F. *Nature, Lond.* 1947, **160**, 189.
11. Arens, J. F., van Dorp, D. A. *Ibid*, 1946, **157**, 190.
12. van Dorp, D. A., Arens, J. F. *Ibid*, 1946, **158**, 60.
13. Arens, J. F., van Dorp, D. A. *Ibid*, p. 622.

Annotations

TO BE CONTINUED

FOR fifty years the voluntary hospitals of London have been largely sustained by King Edward's Hospital Fund, which, particularly in time of crisis, has afforded indispensable support. Now that the maintenance cost is no longer to be borne by private purses, the fund is preparing for a different, though no less valuable, allocation of its resources. At a council meeting held at the House of Lords on Dec. 8 H.R.H. the Duke of Gloucester pointed out that money given to particular hospitals will enable hospital committees to do many things impossible within the limits of a strict budget, "and we are confident that the flow of voluntary gifts will continue." The fund, he said, was concerned with much that was going to influence the quality of the future service: the training schemes for administrators, caterers, and domestic supervisors were being developed, and that for administrators had already proved a great success. Moreover, the fund's work for the recruitment of nurses continued to augment the efforts of the individual hospitals; and the Emergency Bed Service was still expanding.

Sir Wilson Jameson, as chief medical officer of the Ministry of Health, remarked that the Ministry and the various boards and committees charged with organising the National Health Service will have their hands full, "and it is here that the importance lies of having an organisation independent of the Government but working happily with them." With its progressive and enlightened policy in recent years, the fund had led the way in such matters as the Emergency Bed Service, nursing recruitment, training bursaries, and convalescent homes, and these were pointers to future possibilities.

EARLY RECOGNITION OF RHEUMATIC HEART DISEASE

WE are still curiously ignorant concerning the incidence of rheumatic heart disease and its early signs. The mass examination methods of war-time provided a unique opportunity to stop these gaps in our knowledge, and Parkinson and Hartley [1] have analysed their findings in 2500 men referred by medical boards in 1940–45 because of suspected heart disease. Of these men, 806 were found to have heart disease, and in 609 of them (i.e., 76%) rheumatic heart disease was diagnosed. This ratio of rheumatic to non-rheumatic disease closely follows the American figure, for Wilburne and Ceccolini [2] found that heart disease accounted for 6% of the rejections of recruits on mental or physical grounds, and that 63% of the cases were rheumatic. In the hospital population as a whole Bruce Perry [3] found that 38% of heart cases were rheumatic.

In the recognition of rheumatic heart disease Parkinson and Hartley place greatest reliance on radioscopy and a careful examination, including auscultation with the patient erect (or sitting), lying on his back, and lying on his left side after exercise. The history is also important, but it is unreliable because it can easily be falsified. Routine electrocardiography was soon discarded because its value was found to be limited except in specially difficult cases or those with arrhythmia. Of the entire group, 264 (i.e., 32% of all rheumatic cases) had mitral valvular disease, 184 of these having mitral stenosis and 12 mitral incompetence, while in 68 the diagnosis was "mitral valvular disease probable." Of the 184 recruits in whom mitral stenosis was diagnosed, 104 had a presystolic murmur, 13 a mitral diastolic murmur, 5 a loud apical first sound, 2 no auscultatory abnormality

1. Parkinson, J., Hartley, R. *Brit. Heart J.* 1946, 8, 212.
2. Wilburne, M., Ceccolini, E. M. *Amer. J. med. Sci.* 1944, **207**, 204.
3. Perry, C. B. *Brit. med. J.* 1934, I, 278.

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but radiological evidence of mitral stenosis, and 60 only a systolic murmur. This last group is the most important from the point of view of early recognition, and two questions immediately arise—(1) is the murmur functional ("incidental," as Parkinson calls it) or indicative of valvular disease; and (2) if the latter, does it denote mitral incompetence or stenosis? The series contained three groups of cases with an apical systolic murmur—the 60 thought to have mitral stenosis, the 12 diagnosed as mitral incompetence, and 45 of the 68 mitral-disease-probables. How were these differentiated? The two main criteria of stenosis were the loudness and length of the murmur and the typical cardiac outline on radiography. The 12 cases diagnosed as mitral incompetence all had apical systolic murmurs; 6 had a history of previous rheumatic infection; and 5 showed general enlargement of the left ventricle. Of the 68 recruits in the "probable" group there was a previous history of rheumatic fever or chorea in 45; a history of dyspnœa in 14 and of hæmoptysis in 1; an apical systolic murmur in 45; an accentuated apical first sound in 24; a doubtful diastolic murmur in 9; some radiological evidence of enlargement in 38; and right axis deviation in 4. In this group the history, symptoms, and signs together strongly favoured the diagnosis, but they were not conclusive, and in half of them the X-ray note was "doubtful enlargement of the left auricle."

Aortic incompetence was found in 202 of the 2500 men, and all of these had a typical diastolic murmur. That so many cases were found is a striking commentary on the ease with which the diagnosis may be missed in the early stages. The murmur may be so soft as to be missed unless it is specifically and correctly listened for—i.e., to the left of the sternum in the 3rd or 4th interspace, with the patient erect or sitting up and leaning forwards while holding his breath. With these precautions it should not be missed except by those unfortunate auscultators whose hearing is defective in the higher ranges. In the early stages, however, the murmur may not be present all the time, so repeated auscultation may be necessary. Aortic stenosis, of which there were 14 examples in the series, provides no great difficulty. This diagnosis may be made in the absence of a thrill, but a thrill is usually present, though it may be missed if the hand is pressed too hard over the aortic area; slight but firm pressure is the secret of successful palpation.

In his Lumleian lectures some years ago Parkinson [4] said: "By radiocardiology we shall reach a more vital anatomy and physiology, and—earlier in disease—a dynamic pathology of the living heart." His latest investigation confirmed the vital importance of radiology in the diagnosis of heart disease. A full clinical examination is a sine qua non but will not reveal every case. Clinical examination and radiology together make it possible to recognise the vast majority, though there are still a few cases (60 in this series) in which doubt must remain; in these phonocardiography may well provide the diagnosis. It is abundantly clear from this investigation (though the fact has not yet penetrated to the textbooks) that a presystolic murmur is not the earliest sign of mitral valvular disease. From what we know of the natural history of the disease this is not altogether surprising. As the mitral cusps become gradually involved in the rheumatic inflammatory process it is logical to assume that, before becoming adherent to each other and producing stenosis, they should pass through a stage where they are merely slightly retracted and therefore incompetent. This stage is not commonly recognised because there are no symptoms and therefore the patient is not examined unless he wants to join the Forces or insure his life.

4. Parkinson, J. *Lancet*, 1936, i, 1399.

TETRAETHYL AMMONIUM IN PEPTIC ULCER

THE major feature of modern therapeutics is the constant stream of new drugs, but a minor one is the discovery of new uses for familiar compounds. Thus the tetraethyl ammonium compounds were investigated pharmacologically many years ago, but are now being reinvestigated both in this country and in the United States. Principal interest has hitherto centred on their effect on blood-pressure, which, though transient, may be useful in the diagnosis and even the treatment of hyperpiesia and peripheral vascular disease. From animal experiments the compounds appear to act by blocking autonomic ganglia, but there is some doubt whether they exert an exactly similar action in man. Little et al.[1] have now studied their effects on gastric ulceration artificially produced in rats. This is not the occasion to discuss how far peptic ulcers in animals resemble those in man. The important thing is that the course of peptic ulcers produced by pyloric ligation in rats appears to be significantly modified by the administration of 1 mg. doses of tetraethyl ammonium chloride intramuscularly before operation and hourly afterwards. The treatment was continued until the death of the controls from perforation or of the treated by sacrifice, and there was a striking difference in number and size between the ulcers in the control and in the treated group. Further, whereas the ulcers in the controls mostly perforated, the treated rats showed only minor lesions and 3 had none at all. These results have been thought sufficiently promising to justify a tentative clinical test, and Little and his co-workers, encouraged by the results in two cases, are staging more extended trials.

BOECK'S VERY FIRST SARCOID

John H. Stokes and his associates [2] have defined the sarcoid group of disorders as cutaneous affections ranging from erythema to tumour formation, characterised by a benign course and absence of ulceration. They find the lesions distinctive in the formation of proliferative tubercles composed of endothelioid cells and sparse numbers of Langerhans giant cells, usually with a slight lymphocytic reaction; caseation does not take place.

Prof. Cæsar Boeck's patient in 1896, aged 36, and in 1940, aged 80. (Reproduced from Prof. N. Danbolt's paper.)

Tubercle bacilli or other organisms cannot normally be demonstrated in the lesions. In their classification of the group they include four forms: Boeck's benign miliary sarcoid, lupus pernio of Besnier, angiolupoid of Brocq and Pautrier, and the subcutaneous sarcoid of Darier-Roussy.

Cæsar Boeck's first case of "multiple benign sarcoid of the skin" has been re-examined by Danbolt,[3] who says that this patient's record was published by Boeck

1. Little, J. M., Ogle, B. C., Yeagley, J. D., Cayer, D. *Science*, 1947, **106**, 448.
2. Handbook of Fundamentals of Medical Dermatology, Philadelphia, 1942.
3. Danbolt, N. *Schweiz. med. Wschr.* 1947, no. 44, p. 1149.

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simultaneously in Norway and America in 1899,[4] though the original observations are dated Sept. 2, 1896. The man was then 36 years old. On his face, trunk, and extremities he had numerous cutaneous nodules, some of them flat and others protruding; they were sharply limited, and brown or yellowish-red; some showed fine telangiectasia and slight scaling. There was a considerable amount of lymphadenitis. In the summer of 1940 this patient, then aged 80, was admitted to one of Professor Salvensen's beds in the hospital of Oslo University, suffering from a hypernephroma of the left kidney with metastases in the right kidney and the left lung. There were no demonstrable symptoms of Boeck's sarcoid, nor did necropsy reveal changes which might be so interpreted; but in the skin of the face, especially the forehead and temples, there were slight scar-like alterations with some telangiectasia, while on the tip of the nose there were some yellowish spots which disappeared on pressure with a glass. The swelling of the lymph-glands had completely subsided. Nevertheless the Kveim reaction was positive.

This test for sarcoidosis is not widely known in Britain. In 1941 Kveim [5] demonstrated that a heat-sterilised suspension of sarcoid tissue, taken from a proved case of Boeck's sarcoid, could provoke a slowly forming, indolent papule when injected intracutaneously into a patient with the same malady; the sarcoid tissue is best obtained from a lymphatic gland. The papule persists for several months and may break down to form an indolent ulcer. The test is said to be very reliable.

HEROIC SURGERY

IN an account [6] of 100 operations for advanced abdominal cancer, Prof. Alexander Brunschwig, of Chicago University, records performances which will seem almost incredible to older surgeons and may startle even the younger men. His book has been written to recommend radical surgery for conditions generally deemed inoperable; but only a superb craftsman could have contemplated such heroic attacks as are described. For example:

A patient of 39 had a carcinoma of the splenic flexure. To eradicate it, three-fifths of the stomach, the spleen, the splenic flexure and part of the transverse colon, and most of the body of the pancreas were removed. The patient was discharged with a colostomy on the sixty-second post-operative day; five months later his colostomy was closed. A year later an incisional hernia was repaired, and two and a half years after his operation he is still well.

A patient of 46 with a polypoid carcinoma of the upper part of the stomach had the whole of this organ, the spleen, and the pancreas to the left of its neck, all excised in one piece. He lived for over five months. In another patient, aged 28, the whole of the stomach, a large piece of the left lobe of the liver, the body and tail of the pancreas, the spleen, the transverse colon with all the omentum, and a part of the anterior abdominal wall measuring 12×9 cm. were removed. The author believes this to be the most extensive resection on record for neoplastic disease. The patient lived for nearly eight weeks.

How were these great operations possible? Only through the most exact care in preoperative preparation. Blood-transfusions were given whenever the red-cell count was below 4,000,000 per c.mm.; dehydration was always corrected; and a daily urinary output of 1000–1500 ml. was insisted on. Where there had been vomiting, blood-chloride estimations showed whether chlorine was needed. Deficiencies of vitamin K and vitamin C were made good. Great stress was laid on the plasma-protein level: if this was less than 6 g. per 100 ml. the loss was made up by plasma transfusions. Castor oil (1–2 oz.) and 50% magnesium sulphate (2 oz.) were given on the third and second day before operating, to get the alimentary canal empty. After operation the maintenance of fluid balance was held to be of great importance, while nitrogen balance was maintained by infusion of protein hydrolysates. Sulphonamides and penicillin were not regarded as of much value for the prevention of infection.

What was the result of this active operative treatment of advanced cancer patients? Of the 100 patients, 34 died as the result of the operation; 17 lived, with no palliation, up to five months and then died of their disease; 30 lived up to eighteen months after operation and then succumbed; 6 lived for an average of thirty-three months; and 13 are living with an average survival of forty months.

Clearly it is difficult to assess the usefulness of such undertakings. As the operations become greater and greater in extent there must come a stage beyond which the patient, though surviving, is so handicapped that his life is a burden, but where are we to draw the line? In some instances there is no question, because relief is great; for example, where a massive growth is obstructing the pylorus, gastrectomy may give relief even though there are secondary growths in the liver. But where massive parts of the body are removed, defects in function, not always measurable, must remain. How many of these 100 patients were thankful that the operation was done we do not know. Admittedly it is necessary to keep extending the limits of what is surgically possible; but even in successful cases the general enfeeblement caused by a large abdominal operation lasts for months. It would have been instructive to have the postoperative happiness of these patients assessed by an unbiased social worker.

POSTGRADUATE TRAINING IN EIRE

THOUGH the new Health Act, lately passed after three years' resistance, is now being challenged in the High Court by Deputy Dillon as being repugnant to the constitution of Eire, the department of health is going ahead with its development plans. The Medical Research Council grant has been doubled, a tuberculosis chemotherapy research unit has been set up, tuberculosis training courses have been organised, and teams are shortly to be sent abroad for further training. In the past, though many million pounds from the Hospitals Trust Fund have been spent on building and equipment, little has gone to training men. Now the minister for health proposes to establish a postgraduate centre for medical officers of local authorities, which will be located at St. Kevin's Hospital, a large poor-law infirmary in Dublin. He has also appointed a committee to examine the present system of undergraduate and postgraduate education, and to make recommendations on changes required in the curricula and organisation of medical education, on the consolidation or amendment of the Medical Practitioners Act, 1927, with special reference to the control of medical education, registration, discipline, and reciprocity, and on any further arrangements to be made for specialist research in medicine and allied sciences.

LONDON'S HEALTH SERVICES

SOME of its duties under the National Health Service Act were considered by the London County Council last Tuesday. Personal health services are to be administered in nine divisions, each headed by a senior medical officer. These divisions are to be subdivided into 165 areas, each containing about 20,000 people and composed of two or more neighbourhood units. The ultimate aim is to provide for each area a comprehensive health centre, including general-practitioner service, which will be within about a mile of every user's home.

4. Boeck, C. P. M. *Norsk. Mag. Lægevidensk.* 1899, **14**, 1321; *J. cutan. Dis.* 1899, **17**, 543.
5. Kveim, A. *Norsk. Mag. Lægevidensk.* 1941, **9**, 169.
6. Radical Surgery in Advanced Abdominal Cancer. By ALEXANDER BRUNSCHWIG, M.D., professor of surgery, University of Chicago. London: Cambridge University Press. 1947. Pp. 324. 42s.

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Special Articles

DIET AND DISEASE IN THE SUBARCTIC

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THIS article was prompted by a trip "outside" some four years ago. At that time, after ten years of general practice in the Yukon, I once again saw children crippled by rheumatic fever, again heard the words mitral stenosis, chronic nephritis, and toxæmia of pregnancy. It was only then that I fully realised that these afflictions do not exist in my section of the far north.

Having determined to record these peculiarities, I spent three years in confirming my original observations. It has been my opportunity to follow and observe a rather unique natural experiment.

Profitable mining at Dawson has held 1500–2000 people virtually isolated and surrounded by vast sparsely inhabited lands. For the past fourteen years it has been my pleasure and responsibility, at times with one associate, to administer complete medical and surgical aid to this community. The area involved is provincial in size, and consequently it is almost impossible for people here to go outside for anything but the most serious of elective surgery. The nearest large centre is Edmonton, as far south of us as Winnipeg is east of Vancouver (half the width of Canada). This situation leaves me the work of what might be called a "totalitarian" medical practice; the residents must see me, and I must treat them, for everything from cataracts to dandruff.

This group of people is subjected to an environment that is unique and constant. Consequently the incidence of disease therein may with reason be attributed to the presence or absence of factors that differ from other parts of Canada. For one thing, the diet is certainly unusual, and nutrition alone may explain some of the facts about to be related. Every person in the community, wealthy or poor, has about the same diet. There are no slums here, nor can the well-to-do avoid certain physical activities commonly called chores. It is unusual here to see stout flabby men in any walk of life. The tough arctic winter treats all classes with equal disrespect.

RHEUMATIC FEVER

Rheumatic fever does not exist in the Yukon. For fourteen years I have tried to find a typical case, but without success.

There are 350 children in this area under fourteen years of age. This is the number of children named in Santa's list at last year's Christmas tree. This figure does not include very small children or adolescents over fourteen years of age. If these groups are included, the population at an age susceptible to rheumatic fever is much larger than 350. Most of these children I delivered myself; many of them I circumcised, immunised against diphtheria, and operated on for tonsils and adenoids; a few I have watched slip into the oblivion that awaits all.

In such circumstances it is not likely that cases of acute rheumatic fever would be missed. To repeat, to my knowledge the Dawson and Klondyke districts of the Yukon have no case of acute rheumatic polyarthritis, rheumatic myocarditis, pericarditis, or endocarditis; nor has there been any case among the permanent residents. In contrast, general statistics indicate that about six cases should be found constantly in our population. Furthermore, one rheumatic "cardiac cripple" that came here from the outside improved remarkably in a few months and had no acute remissions. He is now working in a garage.

Chorea is not seen. Our northern children have the usual or higher incidence of acute tonsillitis, septic throats, quinsies, and upper respiratory infections. The streptococcus is just as big a nuisance here as in the larger centres. Tonsils are as large, septic, and alluring to the surgeon here as elsewhere. Crowding and poor housing are said to aggravate this disease. In the Yukon housing, on the average, is extremely poor, and usually the children of large families sleep and live in very small cabins. Large houses here are expensive to build and very expensive to heat.

It is also claimed that climatic extremes produce or influence the incidence of rheumatic fever. The Yukon has a very severe climate, with temperatures ranging from full summer heat to a dark dayless 70° below zero, and yet has no rheumatic fever. Since this disease ranks among the first three causes of death in childhood, any light thrown on its ætiology is important.

TOXÆMIAS OF PREGNANCY

In this Yukon district there have been some 400 babies born in the last fourteen years. I have done urine analyses and taken blood-pressure readings on each mother at least six times prenatally. In cases of twins, hydramnios, or those otherwise likely to be toxæmic, more frequent examinations were made. It is very rare to have any woman show albumin to the salicylsulphonic-acid test. The Indians never become toxæmic. Only one patient in my experience had eclampsia. She was not seen before labour, the convulsions atypically starting four days postpartum. This is the only serious toxæmic case in my memory or records. The rarer types of toxæmia, such as acute yellow atrophy of the liver, have never occurred. Moreover, premature births are very rare. Since this is the commonest cause of infant mortality, the latter is very low. Our babies here just don't seem to come too soon.

People in the Yukon consume a great deal of alcohol, but cirrhosis of the liver is very rare; I can recall only one case. To my mind, they also stand surgical shock much better than do their relatives outside. This is especially true of the Indians, in whom the gravest operations cause but slight shock.

NEPHRITIS

That large group of kidney diseases known as Bright's disease, or, better, glomerulonephritis in its three stages, along with its related nephrosis, is unknown in the Yukon. Albuminuria here means usually pyelonephritis or, if in an Indian, a tuberculous kidney. We do not see children with acute nephritis or adults with the usual wet and dry kinds of nephritis. Even the old people with hypertension, which is very common, almost invariably die of cerebral accidents or congestive heart-failure; almost never of uræmia.

Incidentally, we have an overabundance of elderly people in the Klondyke who came here in the days of '98. On the average, I am sure, they live a good decade past their allotted span, unworried about their kidneys and relatively free from those atheromatous patches that ultimately finish most of us.

DIET

What can explain the immunity of this isolated colony of people to these apparently unrelated diseases? I have wondered for years. What element in our lives can explain these facts? The only plausible explanation is diet.

During an average year the residents of Dawson and vicinity eat about 100 tons of imported meat and some 40,000 eggs. There is also available to them an unlimited quantity of wild meat—moose, caribou, rabbits, and fish. Consequently, the poorer the people financially, the more meat they eat relative to the expensive starchy

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foods. The converse is true of the diet in the larger populated centres outside. In the Yukon the starches and sugary foods are expensive because of transport costs, whereas fresh meat is to be had by anyone with a bullet and a strong back. As so-called civilisation advances, human beings eat more and more of the fuel type of foods—i.e., carbohydrates and fats. To their detriment they ingest less and less of the all-important reparative protein foodstuffs.

One summer an Indian fell out of a tree, injuring his neck. I made a trip by aircraft to an isolated lake in the western Yukon to investigate. Upon arrival I learnt that the unfortunate man had died the day before. However, the trip gave me a chance to see a group of Indians who were the subject of an involuntary dietary experiment. The whole village complained bitterly that they were starving, having had no flour, tea, or other store food for some months. To my amazement the whole tribe was fat, alert, and generally in excellent physical shape. Even the babies and small children (some gnawing boiled fish-heads) were energetic, a good colour, mischievous, and acting as healthy children should. At the lakeside there were stacks of fresh whitefish netted in the nearby bay. These people had survived—yes, thrived—on an exclusive, if involuntary, fish diet for months. They eat not only the muscle tissue but also the livers, heads, spleens, and whatever else a fish has.

Practically no northern Indian likes agriculture. Occasionally a man will, if persuaded, plant a few potatoes, but they much prefer to hunt and eat meat. Most Indians regard working in the soil as degrading and undignified.

—AND DISEASE

During my whole time in the Yukon I have seen only two cases of cancer in the Indians, both of them in women married to white men living in town and eating our diet. Is it possible that the glands and entrails of fish and animals provide an immune factor?

It has been shown that the quality of meat depends to a large extent on the food of the animal producing the meat. The same is true of eggs; the hen produces an egg rich or poor nutritionally, according to her diet. Our Yukon protein intake is largely of natural food. The animals eat the native mosses, grasses, and lichens, and not the chopped farinaceous matter of a depleted soil, as is the case with domestic animals. Maybe this natural diet produces a better grade of prophylactic protein. Possibly, also, a superior egg comes from a hen that eats plenty of beetles. It is said that migrating ducks and geese go north because of a craving for some substance found in northern lichens.

Man's gut, I believe, is essentially and basically carnivorous. Our ancestors, like the present-day Indians, did not eat highly processed farinaceous food. Our entodermic tube, with its processing liver and other accessory glands, is set up to receive far more protein than the average present-day human is feeding it. To repeat, we eat too much of the "fuel" foods and not enough of the "building-material" foods.

Rheumatic Fever and Nephritis

Both rheumatic fever and glomerulonephritis are said to be due to, or associated with, the ever-present streptococcus, harboured in septic teeth and tonsils and elsewhere. Yet in both diseases no streptococci are found at the site of the lesions, which are therefore regarded as reactions to diffuse toxins, possibly acting allergically.

Consider now the similarity in this diffuse reaction. Both diseases affect connective tissues essentially, and both cause a proliferative and exudative reaction. In glomerulonephritis the primary lesion is a swelling and proliferation of the endothelium of the glomerular tuft vessels, leading to obliteration of the circulation. The Aschoff body of rheumatic fever is also a group of swollen and proliferating cells of the self-same reticulo-endothelial system; essentially the same kind of cellular reaction in the kidney and the heart. In glomerulonephritis the swollen tufts cut off the circulation to the glomerulus, and this is followed by secondary hyaline and tubular degeneration. In rheumatic fever similar degeneration is succeeded by useless scar tissue and a ruined heart. The end-result of glomerulonephritis is often the same burnt-out mass—a granular contracted kidney.

The exudative factor in rheumatic fever is well known, typically causing the large swollen joints and nodules. In glomerulonephritis the second stage is characterised by the "large white kidney." Is not the œdema of nephritis simply exudation in the extreme? This œdema could be due to a similar degeneration of the capillary endothelial cells or their cement substance, allowing fluid to pass to the tissues. A similar failure in permeability in the kidney glomerular cells could explain albuminuria.

Shock itself may be partly due to increased endothelial permeability. Does not a plasma transfusion amount to a protein rejuvenation? The pure osmotic advantage of the protein molecules in the circulation is not the whole explanation of such a transfusion; otherwise acacia solutions of the same osmotic reading would be as effective as plasma in shock. I suggest that blood-protein transfusions, besides helping mechanically by attracting electrolytes and fluids to the circulation, are also chemical aids in repairing the injured capillary cells. This may be the reason why protein-rich Yukoners do not readily suffer surgical shock.

Arterial Degeneration

The subintimal thickening, endothelial proliferation, degeneration, fibrosis, and ultimate ischæmia of atherosclerosis are also suspiciously like the pathological conditions I have just mentioned. To hazard a purely speculative thought perhaps the dietary habits of the most civilised communities have a lot to do with their prematurely narrowed tubing and all its dire consequences.

Incidentally, most of the progress in modern medicine is being made in the acute bacterial diseases. Could we not spare a little more time for the less spectacular, but really more important, degenerative diseases? Personally, I am more concerned about the insidious progress of my coronary plaques than anything else in medicine.

I fully realise that many of the pathological points made above are subject to question. However, after consideration, it seems to me likely that persistent dietary protein deficiency leads to a uniform pathological lesion in the reticulo-endothelial system with hyperplasia, degeneration, and ultimately substitution by scar tissue. It may well be that these tissues, adequately protected by protein intake, are immune to the constantly recurring minimal doses of toxins, whether from streptococci, pregnancy, alcohol, or other cause. Unprotected and undernourished tissues, conversely, react typically to these stimulants and develop the clinical diseases mentioned. The microscopical and clinical pictures of rheumatic fever and nephritis may at times suggest inflammation; but some of the deficiency diseases—e.g., beriberi—were also regarded as inflammatory before their true nature was known.

Be all this as it may, the Yukon diet is very rich in natural proteins, and this I offer as the explanation for the absence of several important diseases.

CONCLUSION

In an area of the Yukon, lying in the subarctic region, the inhabitants do not suffer from rheumatic fever or glomerulonephritis, while toxæmias of pregnancy are very rare.

These people take a high-protein diet, including much meat.

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Rheumatic fever, glomerulonephritis, nephrosis, and the toxæmias of pregnancy can all be regarded as reactions of protein-starved connective tissue to metabolites of infection.

Experience in the Yukon suggests that rheumatic fever would cease to exist if every child ate an egg daily from babyhood, that toxæmias of pregnancy would be virtually eliminated if every pregnant woman took a pound of meat daily, and that some of the degenerative diseases of the kidney could be prevented by adequate protein intake throughout life.

WORLD FEDERATION OF ASSOCIATIONS OF CLINICAL PATHOLOGY

AN international association of societies devoted to that branch of medicine known in this country and the United States as clinical pathology was brought into being at meetings held in Paris on Nov. 21 and 22 during the first international congress of the Société Française de Biologie Clinique. The conference had been called under the presidency of Prof. Michel Polonovski, of Paris; but at its opening Professor Polonovski, in courteous recognition of the pioneer work of the European Association of Clinical Pathologists, invited its president, Dr. S. C. Dyke, of Wolverhampton, to occupy the chair, and the remainder of the proceedings were conducted under the chairmanship of Dr. Dyke. Delegates and observers attended from Belgium, Czechoslovakia, Denmark, France, Great Britain, Greece, Italy, Peru, and the United States.

The term "clinical pathology," though long employed and well understood both in Great Britain and the United States, is not in general use in many Continental countries, while in others it carries meanings differing from that accepted in Britain and the United States. The conference therefore decided to adopt for international usage the name "clinical biology," this being defined in the terms used by the European Association of Clinical Pathologists as consisting in "the application of pathology and all its related sciences to clinical medicine." The objects of the international association were defined as the establishment of permanent coöperation between the member national societies of clinical biology; and the coördination of their scientific and technical means of action and the furtherance of clinical biology in every aspect of its field by convening conferences, congresses, and meetings and by interchange of publications and even more especially of personnel.

The conference had before it texts of proposed statutes prepared both by the Société Française de Biologie Clinique and by the European Association of Clinical Pathologists. Although prepared independently, these showed a surprising degree of conformity, and in the course of two sessions the conference was able to draw up a provisional constitution. This was designed in general conformance to the rules established by UNESCO for its associated international bodies; it establishes the governing body of the International Federation as a council or commission of the delegates from the national member societies. This council acts through the executive committee elected by itself and consisting of six members. The English and French texts of the statutes will come up for ratification at a full meeting of the council which, it is hoped, will be held in England in the course of the next summer gathering of the British Association of Clinical Pathologists.

The conference elected its officers as follows: president, Dr. Dyke; vice-president, Prof. Raoul Kourilski (France); secretaries, Dr. A. Durupt (France) and Dr. J. Ungar (England); treasurer, Dr. W. H. McMenemey (England). The second office of vice-president was left vacant in the hope that it might be filled by a representative of the United States of America.

National societies devoted to clinical biology and wishing to become members of the international association are cordially invited to communicate with either of the secretaries, Dr. A. Durupt, 20, Rue de la Pompe, Paris, or Dr. J. Ungar, Glaxo Laboratories, Greenford, Middlesex.

A MODERN MATERNITY HOSPITAL

WHEN the old Jewish Maternity Hospital withdrew from its site in Whitechapel, during the war, it gave birth to two daughter hospitals, one at Hampton Court and the other at Stoke Newington. The Bearsted Memorial Hospital at Stoke Newington, named after the parents of the present Viscount Bearsted, who did much to establish it, was actually begun before the war; and though far from complete—it still lacks its upper stories and much of its projected ground plan—it is as fine an example of a maternity hospital as we have to show in this country just now. The new building, which was officially opened by Viscountess Bearsted on Dec. 17, has been in action since last August, and takes 24 mothers in the public wards and 6 in private rooms. Though specially designed to respect Jewish customs and dietary laws, it is open to mothers of all creeds; nor is any discrimination shown in appointing staff.

The main door opens into a warm light waiting-hall, provided with comfortable chairs and a couple of desks at which visitors write notes to patients if they cannot go in to see them. This hall gives the note of the whole hospital, which somehow manages to be airy and spacious, yet intimate.

IN THE WARDS

The wide corridor to the wards is interrupted by a low swing gate of black wood dividing the administrative side from the hospital proper. It has the effect of reminding people that they are entering regions where such things as infection and noise must be kept in mind.

Single-bed private wards open from it, each with its wash-basin, well-sprung bed, and broad Crittall windows which fold back to leave almost a whole wall open to the air—a pleasant thing in summer, for the garden lies outside, and a striped awning can be lowered above the window, to keep the room cool and intercept glare. The light is placed above the bed but to one side of it, so that it cannot shine directly in the patient's eyes; and she can either switch it full on, or dim it to the power of a night-light. If she needs anything, a bedside button sets a buzzer going and lights a red signal in the sister's office, and also switches on a signal light beside the bed which remains burning until the nurse coming to attend her switches it off. Signals of the same type are fitted in the bathrooms.

The main wards are all small—either 2 or 4 beds in each—and are as comfortably equipped as the private wards. All are delicately coloured, with softly tinted ceilings, easy to the eyes.

WORKROOMS

Besides a strong central light, each of the two labour wards has, depending from the ceiling towards the foot of the bed, a powerful bulb set at the end of a long telescopic arm, which remains steady in any position to which it is pushed. The bulb, in its conical shade, can be twisted about on the end of this arm until the light is directed as the doctor or midwife needs.

A ward is provided in which two mothers in the first stage of labour can keep each other company through the tedious early hours. When the upper stories are complete, and the hospital reaches its full complement of 100 beds, it will be possible to convert another small ward, at present being used as a private room, into a third labour ward.

The two sluice-rooms are fresh, light, and warm. Stainless steel bed-pans are placed, after use, straight into a mechanical cleanser which washes them clean and sterilises them with steam. On removal they go into a rack composed of hot pipes, which keeps them at a suitable temperature. Bed-pans are numbered, each patient keeping her own throughout her stay in hospital; when she leaves her pan is sterilised thoroughly before being given out again.

THE NURSERIES

There are four nurseries: a large one, in which the babies in their cots are protected by a glass screen from gusts of air or organisms disseminated by those who enter hurriedly; another of medium size; a small one, for premature babies, which no-one may enter unmasked; and a small isolation nursery for babies isolated because they are suspected of developing an infection. Some of the cots are made in open wire-work, others are smooth-walled receptacles painted in light colours, in which the babies look like something just

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delivered by an expensive florist. Cots of the second type are preferred by the nurses because they protect the child from draughts, are easy to clean, and, unlike the wire cots, have no tiny projections which catch at clothes and shawls.

The babies' baths, in the nurseries, are specially made without taps; a faucet, set in a recess at the back of the bath, is controlled by a pedal near the floor which the nurse operates with her foot. The water it releases into the bath is at a suitable temperature, controlled by a thermostat. The baths, set at a convenient height for the nurse, have tables at their side on which the babies can be laid while they are dressed; and each baby keeps its soap and flannel in a box at the foot of its cot.

THE THEATRE

At one end of the block is a spacious and well-lighted theatre, one wall and part of the roof being of glass. The light over the table is provided by a series of fluorescent tubes, which give a brilliant almost shadowless light. Emergency lamps, running off a battery, are set in the same frame and come on automatically if the main lighting fails. All electric switches are mercury controlled, which rules out danger from sparks.

A small changing-room for the operating gynæcologist and his assistant is fitted with a shower, set at a height which sprays the shoulders and spares the hair.

KITCHENS

The ward kitchens are divided down the middle, all equipment (gas-stoves, refrigerators, cookers, and sinks) being duplicated in the two halves. This makes it possible to respect the Jewish dietary law requiring meat and milk to be prepared separately. Bottles are cleaned and sterilised in a small room designed for the purpose, the sink being fitted with a bottle-brush which spins vigorously when a switch is turned.

The main hospital kitchens are in an adjoining block. They are amply fitted to serve the proposed 100 beds of the complete hospital, though the staff will have to be augmented, of course, when that time comes.

The bedrooms of nurses and domestic staff are a welcome sample of democracy in practice. Domestic workers and pupil midwives—there are 14 in training at the hospital—have identical types of room, with cream walls, a first-class bed, a neat dressing-table and wardrobe unit in light wood, and a good-sized recess to hold shoes and coats. Their windows, like those elsewhere in the hospital, are curtained in canvas printed in good designs; and they are well warmed by radiators. A cheerful dining-room has small green-topped tables.

Eight sisters serve on the staff, all doubly qualified as State-registered nurses and midwives; one is reserved entirely for the care of premature and sick babies. They have chosen to live in a converted Edwardian house in the grounds of the hospital, which gives them a sense of being in a home of their own. The rooms are as various as those in a private house, though each has its gas-fire, well-sprung bed, easy chair, wardrobe, dressing-table, and small graceful desk. Tea is served in the common-room, which though pleasant inevitably lacks the character of rooms about which personal belongings are distributed. The preference of these sisters for the old house seems to bear out the experience of the Marie Curie Hospital [1] that nurses prefer variety in their quarters to uniformity, however perfect the uniform level.

1. *Lancet*, Nov. 15, p. 742.

"... If it takes six years at the university to qualify in medicine, and then at least three years more after qualifying to get a special diploma (and it will soon take five years after qualifying to become a medical specialist) when is a man going to do any original work? Because really original work is done by people under thirty. ... The young men of today are increasingly aware of the dilemma, that they cannot be both physician and scientist. The young man of today who wants to do active original scientific work has got to turn his back on diplomas and professorships of clinical medicine. And he is turning his back, so that any university today would tell you that it is becoming increasingly difficult to fill clinical chairs with first-class whole-time teachers."—Prof. L. J. WITTS, *Listener*, Dec. 11, p. 1009.

Reconstruction

NATIONAL HEALTH SERVICE

STATEMENTS BY NEGOTIATING COMMITTEE AND MINISTER

LAST February a reconstituted Negotiating Committee was appointed to discuss the National Health Service Act with the Minister of Health. The members were:

British Medical Association.—Dr. H. Guy Dain (chairman of the committee), Dr. J. B. Miller, Mr. A. L. Abel, Dr. J. C. Arthur, Dr. J. A. Brown, Dr. O. C. Carter, Dr. R. W. Cockshut, Dr. W. E. Dornan, Dr. F. Gray, Dr. E. A. Gregg, Lord Horder, Dr. J. A. L. Vaughan Jones, Dr. W. Jope, Dr. J. F. Lambie, Mr. R. L. Newell, Dr. J. A. Pridham, Dr. S. Wand, Dr. S. A. Winstanley.

Royal College of Physicians.—Lord Moran, Dr. H. E. A. Boldero, Prof. Henry Cohen.

Royal College of Surgeons.—Sir Alfred Webb-Johnson, Mr. Zachary Cope, Prof. E. F. Finch.

Royal College of Obstetricians and Gynæcologists.—Mr. William Gilliatt, Mr. A. A. Gemmell.

Royal Scottish Medical Corporations.—Prof. Charles McNeil, Sir Henry Wade, Dr. J. H. Macdonald.

Society of Medical Officers of Health.—Dr. G. F. Buchan, Dr. R. H. H. Jolly.

Medical Women's Federation.—Dr. Mary Esslemont.

Society of Apothecaries.—Dr. H. Seaward Morley.

Association of Honorary Staffs of the Major (non-undergraduate teaching) Voluntary Hospitals of England and Wales.—Mr. H. J. McCurrich.

This week the British Medical Association has sent to every member of the profession a statement in which the committee crystallise their objections to the Act, together with a statement made by the Minister in reply.

Committee's Objections

Distribution of Practitioners

The Minister's arguments for abolishing the ownership of goodwill in public general practice are based on the need for better distribution of doctors. But when, under the Act, the same medical payment will be available for every member of the community, wherever he lives and whatever his status, no area will remain under-doctored through inability to purchase medical service. Any deficiency of doctors in particular localities can be remedied by making the terms of service in those localities more attractive.

The Act's procedure is so cumbersome that three or four months may pass before a practice vacancy is filled, during which time the patients may have attached themselves to the locum tenens or to a neighbouring practitioner. The necessary inquiry into the circumstances of every area places an intolerable strain on the Medical Practices Committee, and this committee's decision not to fill a vacancy may oblige patients to join the list of a doctor they have previously rejected.

Doctors deciding to enter the service should be free to choose their area of practice.

Sale and Purchase of Practices

In the committee's opinion the discussions have justified their original view that "abolition of the custom of buying and selling practices has created more problems than it solves." Almost every existing partnership is governed by an agreement; and, according to the Ministry's interpretation of the Act, all these agreements will remain legally valid after the Act comes into force. If so—

An individual practitioner may be required to pay out a sum of money to purchase a share, the compensation value of which is less than the amount he has paid.

As it is impossible to estimate in terms of money the various rights, obligations, and options in typical partner-

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ship agreements, it is also impossible to estimate at the appointed day the shares due to individual partners. This being so, it is impossible to carry out the requirement of the Act that interest should be paid annually to individual practitioners.

A practitioner may be required (*a*) to buy a partner's public practice the capital value of which he cannot realise, the income from which he cannot receive, and compensation for which is not available to him; or (*b*) to buy a partner's private practice which he cannot sell and in respect of which no compensation is payable from the monies provided under the Act.

The assumption that it will be possible to estimate the shares of individual practices (as distinct from individual practitioners) is probably unfounded; for the Act requires, in theory, that the whole of the £66 million, or the appropriate proportion thereof, shall be paid out, and in practice there will be an undistributable residue. The Government cannot keep its promise in regard to the relief of hardship, and at the same time put into operation the Act in its present form.

If the Ministry's interpretation is correct, unfairness amounting in some cases to expropriation will result, and practitioners desiring to remain outside the service may in self-protection be forced into it. On the other hand, if this interpretation is wrong (as Sir Cyril Radcliffe, K.C., and Mr. J. H. Stamp believe) a practitioner who fulfils his obligation to buy or sell a share will be liable to a fine or imprisonment or both. A final ruling on this matter can be given only by the House of Lords, and meanwhile no practitioner can be sure of his position. It is unjust to leave a demonstrably ambiguous Act unamended, and the financial situation of practitioners uncertain, until a case has been fought out in the courts. Doctors who do not join the service by the appointed day do not qualify for compensation, and for this reason alone the position should be precisely defined at least six months before that day.

It is in the best interests of the public and the profession that general practitioners should retain the ownership of the goodwill of their practices. This ownership provides an important incentive, encourages good and keen work, provides a basis for coöperation between practitioners and a bond between doctors and their patients. Although emphasis is laid in this statement on the unworkability of the Act in this respect, the issue of ownership of goodwill is regarded by the medical profession as fundamental to its freedom.

Partners and Assistants

In partnerships formed after the appointed day and involving a practice in the public service it will be illegal for the partners to distribute the emoluments except in the proportion in which they are earned: a sale of goodwill is deemed to have taken place where "services are performed by any partner for a consideration substantially less than those services might reasonably have been expected to be worth having regard to the circumstances at the time when the agreement was made." Since it is hard to assess the "worth" of the services of either a senior or a junior partner, and their respective value is liable to change, the general effect will be to discourage partnerships. It is ironical that an Act which aims at the development of group practice should do this.

Similarly, a practitioner who pays an assistant substantially less than his services "might reasonably have been expected to be worth" and who afterwards admits the assistant to partnership commits an offence. In this way the Act discourages practitioners from admitting assistants to partnerships, and hence discourages the newly qualified doctor from doing what is highly desirable he should do—namely, serve as an assistant before he becomes a principal. More and more practices will be left with no-one in charge when a principal dies or retires.

It may be argued that the system of registration of agreements with the Medical Practices Committee will protect the profession from the above dangers. But nothing is known about the attitude which this committee may adopt. And however much the committee may desire to do nothing to endanger partnerships and assistantships, or to endanger practitioners, it cannot act except in conformity with the statute.

Remuneration

The committee hold that, except in special circumstances, the remuneration of general practitioners should be by capitation payment in proportion to the number of persons on a doctor's list, and that this principle, which they regard as fundamental, should be embodied in the Act. They are opposed to the payment generally of a salary, basic or other.

The remuneration of specialists for hospital work should be on the basis of annual payments. Specialists should be free to decide whether they will undertake domiciliary work, and those who do so should be paid according to items of service rendered.

Midwifery

By imposing a qualification in addition to the statutory qualification the Minister has taken power to restrict the right to participate in the midwifery services. This is unnecessary and undesirable.

Nursing-homes, Hospitals, and Private Patients

It is undesirable, too, that the Minister should be empowered to establish a monopoly in hospitals. State-ownership of nursing-homes would tend to deprive the profession of facilities for independent practice, continuance of which is necessary to the maintenance of a high standard of medical service. Private nursing-homes, whether carried on for profit or not, should not be acquired under the Act.

The Minister's discretion should be replaced by an obligation to permit specialists in the service to treat private patients in private beds at their own or any other hospital. To set a maximum on fees chargeable to patients who pay the full cost of private accommodation would be wholly inappropriate. In at least a proportion of private beds arrangements between the specialist and the patient should not be subject to control by regulation.

Administrative Bodies

After the initial appointments, local executive councils, boards of governors of teaching hospitals, and hospital management committees should elect their own chairman.

Local health authorities should be required to coöpt to health committees practitioners representative of the local profession.

Right of Appeal

There should be a right of appeal to the High Court against a decision to remove a practitioner's name from the list(s) of any or all executive councils.

General Comment

In concluding their statement (of which the above is only a brief summary) the committee say that the Act involves an excessive concentration of power in the hands of the Minister, and as it now stands is in many respects unacceptable to the medical profession. It is full of legal perplexities and anomalies which could only be resolved, if at all, after prolonged litigation accompanied by widespread uncertainty among the profession and the public. Many of its provisions are fraught with the risk of grave hardship to patients and with serious injustice to doctors and their dependants. Even with the utmost good will on the part of the medical profession its wording is in places so obscure that to bring it into force as it stands will create chaotic conditions.

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Replies by the Minister

In his detailed answer to the committee the Minister says that he sees no sufficient reason for asking Parliament to amend the Act before the new service has been tested in operation.

Distribution of Practitioners

Especially when doctors are scarce, it cannot be assumed that payment in respect of all (or almost all) the people will result in an equal distribution of doctors in relation to population. The new service reserves the right only to say in what areas it has no need for additional participants or replacements. This is the minimum interference with distribution of a public service that could be justified. Without it doctors would have a right to demand publicly remunerated work where they like.

The procedure for obtaining consent to practise will not be as cumbersome as the Negotiating Committee suggest. The Medical Practices Committee, keeping in regular touch with local executive councils, will know the areas where there is no need for new public practice or replacement—and these will be few, for many years to come, until the number of doctors has increased. Apart from such areas consent can usually be given automatically, unless there are two or more claimants for one practice. And, even so, the period of settlement should normally be nearer one month than four.

Sale and Purchase of Practices

The Minister, on all the legal advice he has obtained, believes that partnership agreements will remain valid after the appointed day. If the courts prove his interpretation wrong he will ask Parliament to correct the Act in this sense. In his opinion existing powers or obligations between partners to buy or sell shares of a practice can be fulfilled; regulations can be made which will dispose of all the major difficulties. If on the other hand his advice is wrong, it is always possible for partners to vary the terms of their partnership and so remove anomalies which cannot be covered by any general provision. Likewise, partners who anticipate difficulty over the future purchase of shares under the partnership agreement could agree among themselves that the price to be paid for such shares shall be the same as, or not exceed, the compensation assessed in respect of those shares. It appears most equitable to pay the interest to the owner of the asset for the time being.

A partner within the service, required to buy the share of a partner not in the service, will receive compensation for the share so bought, on the basis of the value at the appointed day. The effect of this will be payment of compensation for which there is no provision in the aggregate amount of compensation. On the other hand, when a partner not participating in the service buys the share of a partner who is in it, compensation in respect of that share will no longer be payable to the partner in the service, since he will have suffered no loss. Here there will be non-payment of compensation for which there is provision in the aggregate. For the time being the Minister proposes to assume that the excess and the saving in these two instances will balance one another. The balances can hardly be exact and will need later adjustment.

If the total amount provided for compensation proves insufficient because all general practitioners join the service on the appointed day, the Minister will ask Parliament to increase the global sum appropriately.

Partners and Assistants

The main object of new partnerships formed after the appointed day will be greater convenience and better facilities for practice. The remuneration of each partner must be assessed on the general basis of his value to the partnership, and can take account not only of his earnings but of his knowledge, experience, and standing. There seems to be no reason why this basis of partnership should discourage partnerships in future, or why the buying and selling of shares should be regarded as the essence of a partnership in medical practice.

As for assistants, an offence will be committed only if the assistant is paid so obviously less than he is worth as to amount to a sale of goodwill. In case of doubt a certificate from the Medical Practices Committee gives a complete safeguard. The Minister agrees with the committee about the desirability of an initial period of assistantship, but cannot think that the difficulties they anticipate are likely to arise.

Remuneration

To translate the recommendations of the Spens Committee into actual terms of remuneration for general practitioners the Minister proposes to establish a central fund equal to a capitation fee of 18*s.* multiplied by 95% of the population. (This 95% will be reconsidered after two years, having regard to the number of people found to be using the service.) On this fund there will be a first charge for (*a*) mileage, fees for temporary residents, emergencies, and anæsthetics, and (*b*) a fixed annual payment of £300 to every practitioner who accepts a reasonable number of patients. The rest of the fund will be distributed to each executive council on the basis of a capitation payment multiplied by the number of people on the doctor's lists plus one-third of the number not on the lists. This will then be distributed among the doctors of the area in the form of a capitation fee for each person on his list.

In addition, a sum equal to 1% of the central fund (about £400,000) will be attached to the central fund to enable extra "inducement" payments to be made to doctors practising in peculiarly difficult (e.g., sparsely populated or unpopular) areas. On these proposals:

The estimated civilian population of Great Britain at June 30, 1948, is 47,750,000.
Therefore 95% of this number is 45,362,000.
A payment at the rate of 18*s.* per head of this number would produce a central fund of £40,826,250.
Assuming 17,900 principals take part in the service the deductions to be made from this amount would be:

(*a*) Mileage payments, say	£1,000,000
(*b*) 17,900 fixed annual payments of £300	£5,370,000
	£6,370,000

Leaving a net amount to be distributed of £34,456,250.

If the full 95% of the population were actually on doctors' lists the payment per head (additional to the £300 fixed sum) would still be about 15*s.* 2*d.* The gross income (inclusive of receipts from private practice, obstetric service, mileage, &c.) would be:

1000 public patients	..	£300 + £758	= £1058
2000 ,, ,,	..	£300 + £1516	= £1816
3000 ,, ,,	..	£300 + £2274	= £2574
4000 ,, ,,	..	£300 + £3032	= £3332

There would also be a pool of £408,262 available for "inducement" payments.

Remuneration of specialists will be considered with the profession when the report of the Spens Committee on Specialists is received. The Minister considers that specialists should, as widely as practicable (though not universally), accept as part of their duties domiciliary work within defined limits.

Midwifery

Within the service, general practitioners who express a desire to practise midwifery and answer calls from midwives will be asked the extent and nature of their obstetrical practice during the preceding three years. Their particulars will be placed before a local professional committee which will compile (and periodically review) the local list.

Nursing-homes, Hospitals, and Private Patients

The Minister is under obligation to provide an adequate hospital service, and he must clearly have transferred to him all existing hospitals essential for the provision of the service now, with powers to acquire land and premises in future. But no absolute monopoly of

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hospital provision is in view. Each unit liable to transfer is already being given opportunity to advance reasons for its exclusion. In general a nursing-home would have prima-facie grounds for exclusion; and those run for profit are not transferable at all. The acquisition of a number of small private nursing-homes would be an uneconomic and unsatisfactory way of developing the service.

The Minister intends that all medical members of hospital staffs should be allowed to treat private patients in any private accommodation in the hospital; but arrangements must ultimately depend on local facilities. He is prepared—where circumstances permit—to allow a proportion of private beds to be used without any prescribed maximum for fees to the patient.

Administrative Bodies

The Minister agrees that after the first appointment local executive councils should nominate their own chairmen. Any views expressed by boards of governors and management committees about succession to the chairmanship will be given full weight.

He has no power to compel local health authorities to coöpt non-elected members to their health committees, but he will encourage them to do so.

Right of Appeal

The Minister, being responsible for the service, must decide in the last resort whether it is possible to retain a practitioner whose retention, in the tribunal's view, would be "prejudicial to the efficiency of the service." He could not answer to Parliament for a doctor whom he was forced to retain. Provision will, however, be made for him to consult an advisory committee of the type which has advised on similar cases under the insurance scheme. The doctor has the ordinary legal rights to go to the courts on grounds of unlawful action by the Minister or others.

General Comment

Being responsible to Parliament and the nation, the Minister must have ultimate jurisdiction as to the nature and quality of the service provided. But the Act has gone as far as it justifiably could in providing that he should delegate this responsibility to regional and local bodies in which the profession and others are strongly represented.

The Act will be amended, without doubt; the scheme will be bettered and remoulded as experience is gained. But first it has to be begun if there is to be that experience. The Minister is confident that the mass of men and women working in the medical field now, or about to enter it, will join him in beginning it and in constantly improving it.

Minister to Doctor

The Minister's main statement is prefaced by some general comments addressed to the individual doctor who wants to know how participation in the service would affect him personally.

The term "service," he says, is a misnomer if it is held to imply an organised corps. There is no hierarchy of "supervision" or interference with a doctor's professional judgment and clinical practice: "he undertakes to look after patients and is left to do so in his own way and to the best of his clinical ability." Nor is the practitioner "employed": he enters into a contract which in essence is to look after the patient whose care he undertakes—and to be paid for it from public funds, in these cases, instead of by private fee. He is certainly not a civil servant.

The aim will be to set 4000 as the maximum number of patients for a doctor under the scheme, but there is no rigidity in this. Any doctor can also retain private practice.

Compensation and Superannuation

Doctors who participate on the appointed day will establish their claim to their share of the £66 million set aside as compensation for their being unable in future to sell public practices. The Minister is prepared to take the profession's advice as to how this should be equitably distributed. Normally, it will be payable when capital values would otherwise be realised—on retirement or death—with interest in the meantime. But if there is hardship, like some undue debt burden on the practice, it can be paid at once. If a doctor wants, later on, to stop practice for any reason he can draw his compensation at once and do so.

In addition, a superannuation scheme is to be started, the doctor contributing 6% of the payment he receives in the new service (less a percentage for "practice expenses") and the Government 8%. The benefits will include a pension and a lump sum on retirement, a death benefit, and a widow's pension.

Assistants

As before, the engagement of assistants, paid by the doctor, will permit of enlarged lists of potential patients. In addition there will be a system of grants to doctors for the training of young assistants.

Health Centres

As and when health centres are set up, no doctor will be compelled to practise in them. In such health centres the personal relationship (of "my doctor") will be retained. They will be a substitute for the doctor's home surgery, publicly serviced and equipped. Group practice, like present partnerships, will be encouraged in them.

Doctors in the Running of the Service

Doctors are, for the first time, brought on a substantial scale into every main field of administration of the new scheme—regional hospital boards, boards of governors of teaching hospitals, and executive councils. It is a new experiment in bringing the profession itself into the direct administration. In addition there is to be a Central Health Services Council, with a majority of doctors (to advise the Minister on the whole scheme), and a special Statutory Advisory Committee of the Medical Profession. Both can advise without being asked and the Minister has to publish the Council's report (save only where the public interest prohibits).

The Object

The object of the new Act is a simple one. It is to help, by public funds, to ensure that anyone—the highest and the lowest—should be confident of getting all the best that a great profession can give. If the profession rally to it, the greatest health service in the world can come into being. There is no reason whatever why the personal relationship of doctor and patient—and the professional independence of the doctor—should be affected by a switch-over from private fees to public funds.

A scheme of this magnitude is bound to need correcting, amending, as it is found wanting. But, in its conception, it is something of incalculable social value to the great mass of the population, and the medical profession will be the first to want—as they have wanted—something of this kind. For his part, the Minister is concerned mainly to get this great national scheme launched, and to plan on wider, better lines, with the profession directly coöperating in the management of the new service. He asks the profession to help him in launching it next year and in constantly improving it as it goes along. It is a big thing, and he is confident that the profession will join with him, as constructive and often properly critical partners, in getting it under way.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE English medical congress is a notably sedate event at which quiet conversations between friends are interrupted from time to time by a formal address whose content is as familiar to listeners as to the speaker. Elsewhere they manage these things better. For example, an advance bulletin heralding a congress in the New Year and in the New World promises that "the social program will be intense." Now in Britain the only concession to sociability is a congress dinner (30s., excluding wines) and, with luck, a reception by the mayor. Not so at next month's meeting. "Among the events is the . . . Fiesta, in which the participants of both sexes will be attired in typical regional costumes; they should therefore not forget to include this costume in their baggage." This plainly sets a sticky problem for the distinguished British representative. If only he were Austrian, or Dutch, or Danish, it would be easy. Perhaps by claiming a grandmother north of the Highland line he could appear in some non-committal tartan without fear of reprisal. If not he will, I suppose, be driven back to the battered bowler and frayed umbrella which seems to have become the native costume of middle-class males in our region.

* * *

An old friend, who asks me to dinner when I am well and promptly puts me into one of his hospital beds when I fall ill, is shortly to retire, having reached the age limit for a professor of medicine. He has to deliver a valedictory address to his students, and his subject is to be: "What to Say to the Moribund." Some doctors, he says, have a rule-of-thumb solution for this most delicate of problems: not a word, not a gesture to indicate the approach of death. Such doctors will have nothing to do with the mysteries beyond the veil. The professor himself has as many solutions as he has moribund patients, with this one rule applied to all—to do as he would be done by. One of his patients was an old cancer-phobe doctor with a tumour in the lower abdomen. "Is it that, Professor?" he asked. "Yes, I am afraid it is," came the answer, and the word cancer was never mentioned. It is curious, the professor notes, how seldom hospital patients themselves broach the subject of impending death. Is it that the relation of hospital doctor to hospital patient is seldom tête-à-tête and leisurely?

Looking back, I can remember only one occasion, 40 years ago, when I blurted out a death sentence. It was murder with a bludgeon. The patient was a middle-aged chemist recently admitted to a private sanatorium whose one and only doctor was about to take a holiday. The doctor said to me as I took over: "So-and-so is a 'gonner.' It is your duty to tell him so." There was still plenty of fight in him when I began. When I had finished a minute later he was down and out. A knock-out blow in the ring could hardly have been more instantaneously effective.

Once I was the recipient instead of the donor of a death sentence. The exceedingly able doctor in charge of me felt obliged to tell me my days were numbered. He did so with infinite tact and well-graduated circumlocution. I smiled to myself, for the point to which he guided me so skilfully was one I had reached long before on my own account. Now he is dead and I am alive and kicking. All of which suggests that silence is golden.

* * *

Patients always say they have never closed an eye all night; their nurses always swear that they have put in the regulation eight hours. The psychiatrist adjudicates according to—well, perhaps according to the laws of chance more than anything else, with some attention to the dictum that if the patient says he has not slept well then at least he has not slept well enough. A night in a tilted armchair in a transatlantic plane is instructive. All night, it seems, one is not sleeping; one hears the engines all the time; one even looks at one's watch like the patients who report the hourly striking of the clock—and suddenly and inexplicably it is Gander, and one has certainly not been *awake* for eight or nine hours. It seems that an interrupted sleep or a light sleep, either of which allows some perception of the surroundings, gives the impression of sleeplessness.

Letters to the Editor

GASTRIC CANCER

SIR,—A whole corpus of statistical legend has gradually grown up around the subject of gastric cancer. There is little or no evidence in support and strong evidence against, but, as the history of medicine shows, facts can be almost powerless against the imaginative appeal of the attractive story. Mr. Shorter (Dec. 6) gives all the main myths with an excellent bibliography in a single paragraph. He tells us that though the total incidence of all forms of cancer is much the same in different communities, gastric cancer has important variations. "The racial incidence varies from 20% of all cancers in Great Britain to about 40% in America"; the preponderance of males is much greater in America; "the highest incidence" is "between the ages of 40 and 60"; gastric cancer is "much commoner in the poor than in the rich."

It is impossible to impugn so many statements in a single letter, but the following table is one of many which could be constructed from official figures to show how similar the incidence of gastric cancer is in comparable populations; and if Mr. Shorter cares to browse more carefully into available death returns, he will see how unwise he has been to rely on the authors whom he cites. The 1939 English and 1940 U.S.A. figures have been chosen as the latest available information undisturbed by war from the particular countries Mr. Shorter has mentioned.

Gastric cancer: male mortality per 100,000

Age-group	*England and Wales* (1939)	*U.S.A.* (1940)
25–35	2·1	2
35–45	10·7	11
45–55	42·8	43
55–65	108	111
65–75	217	199
75–	297	210

These figures demonstrate how readily huge differences in the apparent incidence of gastric cancer can arise if statistics are handled light-heartedly. The incidence over the age of 65 (where diagnosis and death certification is most unreliable) is high compared with the incidence in the younger age-groups where full investigation and operation are probable. Unless care is taken to allow for the exact age and sex distribution of the populations compared, and to consider the effect of varying investigation and autopsy facilities in the older age-groups, the undoubted similarities will be obscured by the dubious differences. Exact figures also show how rarely gastric cancer is the cause of indigestion and how impractical it is to push investigation to the point of diagnostic laparotomy.

London, W.1. DENYS JENNINGS.

CLINICAL IMPRESSIONS OF MALARIA AND LIVER DAMAGE

SIR,—The paper by Professor Maegraith, Dr. Andrews, and Dr. Gall in your issue of Nov. 29 encourages me to describe a group of cases I saw in Siam while a prisoner-of-war.

Two of us were medical officers to a party of 400 men working on the Mergin road from May to August, 1945. Of these, 100 died; and about half of these died in an unusual manner. Their illness began with a continuous fever of about 102°F. After five days they began to hiccup and became deeply jaundiced. After another four days they went into coma. This was not the irritable coma with hypertonia of cerebral malaria but a deep coma with stertorous breathing suggestive of hepatic failure; after every few respirations they would hiccup. After three days in coma they died. At the onset there was complete anorexia. Vomiting was present but was not severe. There was no hæmaturia or tendency to general hæmorrhage. The urine was scanty and coloured by bile pigment—not hæmoglobin. There was some enlargement of the liver and spleen, but of no great degree. At first we thought this was a leptospiral infection, but later some men were evacuated to the hospital camp at Nakon Paton and died in this manner. We heard that the blood slide from all of them showed *Plasmodium falciparum*. It is my feeling that these cases were due

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to a hepatotoxic strain of *P. falciparum*. They did not resemble the textbook description of bilious remittent fever, which I did not encounter.

Another camp in Siam, called Hindato, had a higher incidence of cerebral malaria than anywhere else. I used to wonder whether the local strain of *P. falciparum* was perhaps of an encephalopathic type. We treated these cases with home-made intravenous quinine. Just under half of them died. Those who recovered invariably had a large bed-sore. Blackwater fever, on the other hand, was sporadic in incidence—which suggested to me that it was due to a variation in reaction by the patient, not by the parasite. We had cases in men who had never taken quinine. We treated them where possible with mepacrine tablets crushed up in boiled water and given intravenously. One man recovered, though treated with quinine, as quickly as those given mepacrine. Only about 1 in 4 of the patients with blackwater fever died—usually of superimposed cerebral malaria.

We had an occasional case of dysenteric malaria, and my impression was that it was due to the interaction of two diseases. I saw no case of a choleraic, algid, cardiac, or purpuric type. I saw 3 cases resembling acute hæmolytic anæmia with air-hunger, and a lemon-yellow skin and conjunctivæ, without hæmoglobinuria. Cases presenting with features of an acute abdominal condition were probably due to salt-deficiency cramps, and usually after an hour the abdominal rigidity had worn off.

London, S.W.3. F. E. DE W. CAYLEY.

GLANDULAR ENLARGEMENT OF UNCERTAIN ORIGIN

SIR,—This report on a case seen in general practice, in which an early diagnosis of glandular fever had later to be reviewed against an alternative diagnosis of atypical rubella, is prompted by Dr. Royd Jones's article (Dec. 6).

The patient, a school-teacher, was an unmarried woman, aged 41. First seen on May 20, she complained of slight malaise for one day, accompanied by a generalised faint pink macular rash. Temp. 99°F, pulse-rate 86 per min. The cause of her indisposition was considered to be her tonsils, which were both covered with exudate. The tonsillar glands were enlarged and tender. The throat was not sore, however, either then or on any of the subsequent 12 days on which the tonsillar exudate remained. She felt reasonably well throughout her illness, except for a certain amount of neckache and malaise on the first 4 days. She was put on sulphamezathine, 2 g. four-hourly.

2nd day.—Increased exudate on tonsils; tonsillar glands larger. Glands in posterior triangle, postauricular and occipital glands enlarged and tender. Nasopharynx healthy. Ears normal; no scalp sepsis. Spleen not palpable. Temp. and pulse-rate normal, and remained so for the rest of illness. Sulphamezathine was stopped after 12 g. had been given, being obviously ineffective.

4th day.—Enlarged tender glands both axillæ and groins. Slight conjunctival injection. Very marked irritating cough without obvious cause: thought to be due to enlarged mediastinal glands. Rash faded. Throat-swab—no diphtheria bacilli, Vincent's organisms, or hæmolytic streptococci. Paul-Bunnell test negative. White blood-cells 6000 per c.mm. (polymorphs 58%, lymphocytes 28%, monocytes 11%, eosinophils 2%, basophils 1%; about one-third of the lymphocytes were abnormal in type).

5th day.—Spleen palpable; remained so for 5 days. Otherwise no change.

9th day.—Still abundant exudate on tonsils. Glands unchanged. Further throat-swab revealed no pathogenic organisms. Given penicillin lozenges to suck hourly.

12th day.—Throat much cleaner and glands in neck beginning to subside. Axillary and inguinal glands unchanged. Repeat differential white-cell count (different laboratory): polymorphs 37%, small lymphocytes 27%, large lymphocytes 12%, monocytes 7%, eosinophils 4%, Türck cells 1%, atypical lymphocytes 2%.

18th day.—Throat clear. Glands in posterior triangle of neck, tonsillar and left axillary glands just palpable.

25th day.—No palpable glands. Patient recovered.

From the 3rd day onwards this seemed to me clinically most likely to be a case of the anginose type of glandular fever. But the negative Paul-Bunnell test rather shook my confidence in the diagnosis, and as an alternative I favoured the possibility of atypical rubella, of which there were several cases in the immediate vicinity. There was, however, also a proved case of glandular fever with a positive Paul-Bunnell test in the neighbourhood at the same time.

I recollect seeing another case, clinically identical with glandular fever, in which there was a history of prolonged contact with a proved case of glandular fever, and in which a negative Paul-Bunnell test left one hard-pressed for a diagnosis.

Great Dunmow, Essex. PETER A. WALFORD.

ORIGIN OF CEREBRAL SURGERY

SIR,—The case mentioned by Major-General Holt (Nov. 1) was described by my late friend, Walter E. Dandy, in Lewis's "Practice of Surgery" (vol. XII, p. 13):

"During the discussion of Godlee's paper Ferrier reported a case of brain tumor operated upon by Lister some time before Godlee's case. The patient had hemiplegia of the left side, the right eyeball was more prominent than the left and headache was in the right frontal region, the patient being semiconscious at the time. Lister trephined over the right frontal region and the brain protruded so markedly through the defect that exploration was impossible. He introduced his finger into the cortex, ruptured a hydrocephalic ventricle but could feel no tumor. The patient improved during the next few days owing to the evacuation of fluid, but coma again developed and death occurred eight days later. The wound had healed so perfectly that Lister was confident that surgery of the brain was assured. At necropsy it was found that the tip of Lister's finger had missed the tumor by only half an inch. Although unsuccessful by a narrow margin, this case may also be regarded as the beginning of intracranial surgery, but so far as I can learn it has never received recognition."

HEINZ KÖBCKE
Editor, *Deutsche medizinische Wochenschrift.*

Tübingen.

TREATMENT OF STRANGULATED FEMORAL HERNIA

SIR,—An important clinical syndrome to which insufficient reference is made in surgical textbooks is the strangulated femoral hernia of several days' duration. In these cases the gangrenous portion of bowel has sloughed, and the process has not infrequently extended to abscess formation. The classical clinical picture is modified by this late complication in that all the signs of inflammatory reaction have developed in and around the inguinal swelling. These signs, in addition to the length of history, the presence of intestinal obstruction, and the general condition of the patient, make the diagnosis of the complication strongly probable.

In such a case the orthodox surgical approach is as likely to kill as to cure, since the grave risk of a fatal form of peritonitis is almost unavoidable. There is also the considerable factor of a major operation involving resection in a debilitated and toxic patient. I have for many years been increasingly convinced that an alternative surgical procedure is life-saving and that the end-results are equally satisfactory.

After replacing fluid and salt loss and aspirating the proximal gut, the abdomen is opened by a right or left subumbilical paramedian incision. A lateral anastomosis is then performed by the aseptic method between the distended in-going and the collapsed out-coming segment of the ileum. The inguinal swelling is left untouched. Several days later a fluctuant abscess has formed which is incised and drained. The pus has a faeculent odour and there are usually sloughs which are gently removed at the same time.

No fæcal fistula or persistent sinus has resulted from the incision, and no further operation has been carried out on any case treated in this way. Adequate repair is probably achieved by plugging of the femoral canal with scar tissue. I believe that this method of surgical management in the late strangulated femoral hernia involving intestinal obstruction should be more widely known.

Whipps Cross Hospital, London, E.11. D. LANG STEVENSON.

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STREAKY BLOOD FILMS

SIR,—The observations of Boveri, Waterfield, and Newman, recorded in your issue of Dec. 6, appear to be related to some unexplained observations I made on the bloods of Africans suffering from gambian trypanosomiasis.

In these bloods the plasma albumin-globulin ratio is usually reversed. There is intense rouleaux formation and the blood-sedimentation rate (B.S.R.) is much increased. I do not know if the plasma-fibrinogen is usually altered. If the B.S.R. is performed with whole citrated blood and repeated after remixing one hour later the two results are almost identical. If, however, defibrinated blood is used with or without citrate, the first B.S.R. reading is only slightly less than that of whole blood, but on remixing at the end of one hour both sedimentation and rouleaux formation have entirely disappeared. This occurs at blood temperature and at 0°C.

One part of a 10% solution of suramin to 4 parts of blood is an excellent anticoagulant, and it also prevents rouleaux formation and sedimentation. These properties might be of practical use in hæmatology.

Dorchester. C. HOLLINS.

PROLONGING THE EFFECT OF INJECTED SUBSTANCES

SIR,—Sir Alexander Fleming, F.R.S., discussing the properties of penicillin at the International Conference of Physicians, is reported in your issue of Sept. 13 to have said: "Lately the main objection to the oil-beeswax mixtures—that they solidify on cooling—has been overcome; but prolonged action can equally well be obtained by injecting very large doses of a watery solution."

At the Hamburg meeting of the German pharmacologists on Aug. 23 I showed, on the basis of experiments with R. Kindler, that the effect of morphine injected subcutaneously into dogs (1 mg. per kg. body-weight) could be greatly increased in duration by increasing the dilution of the morphine solution. The implications of this observation for general pharmacology are discussed in an article which is to appear in the *Zeitschrift für Naturforschung*. Sir Alexander Fleming's statement reflects the bearing on clinical medicine of this finding.

Institute of Pharmacology, University of Hamburg. KLAUS SOEHRING.

INTENSIVE TREATMENT OF KALA-AZAR WITH SODIUM ANTIMONYL TARTRATE

SIR,—I read with considerable interest the article by Dr. Adams and Dr. Seaton (Oct. 18), and noted that the authors were most careful not to make extravagant claims for this treatment. Nevertheless, I have subsequently heard several comments on this paper which suggest that it may have conveyed a wrong impression, and, as there are few today who have had much experience with the antimonyl tartrates in the treatment of kala-azar, some cautionary remarks would not, I feel, be out of place.

I used sodium antimonyl tartrate from 1917 until 1923, almost exclusively, in the treatment of oriental sore and kala-azar. In 1923 I obtained large samples of a variety of pentavalent antimony compounds for trial in kala-azar, and, finding that even the least effective of these gave better results than sodium (or potassium) antimonyl tartrate, we abandoned the latter drug for use among inpatients; but, as we always had between fifty and a hundred outpatients under treatment, we had to continue to use the antimonyl tartrates among these, for several years.

Before the introduction of the treatment by the antimonyl tartrates, kala-azar was a fatal disease; possibly between 5% and 10% of patients recovered spontaneously while under treatment, but there was little evidence that any special treatment was responsible for these recoveries. Therefore, a drug that produced a 75% cure-rate was naturally received with enthusiasm, and the disadvantages and dangers associated with the treatment were accepted as *relatively* unimportant. Actually, they were considerable, and frequently compelled us to modify the prescribed course of injections. The most troublesome by-effects were violent coughing, vomiting, and joint pains. In addition to this there was always a high mortality among patients under treatment. In a series of 139 hospital patients treated by sodium antimonyl tartrate, which I reported in 1924, 14·4% died. This was a lower death-rate than that reported by Knowles in 1920. Pneumonia was a common cause of death. When the pentavalent compounds came into use deaths during treatment became rare and pneumonia was practically unknown.

A variety of strengths of sodium antimonyl tartrate were used, but as no differences in the effects of the various strengths could be detected, a 2% solution became the standard strength. We never attempted to give a concentrated course on the lines adopted by Adams and Seaton, but it seems unlikely that this concentration would diminish the unfavourable by-effects of this drug.

The two advantages claimed for this course are rapidity and cheapness. The latter must be granted, but, if experiments are to be made with concentrating the course, would it not be better to use one of the benign pentavalent drugs such as 'Neostibosan' or sodium stibogluconate? The former has been used in daily (divided) doses of 1·5 g. in the treatment of filariasis.

When the results achieved by Adams and Seaton are critically analysed, they amount to the fact that, of 6 patients, 3 were followed for only a short time and may or may not have been cured; on 1 the treatment had no effect; 1 relapsed but was apparently cured by a second course; and 1 was apparently cured by a single course. It is also of interest that 1 developed pneumonia. The only conclusion that can be drawn from the results in this small series is that it is possible to cure kala-azar with a two-day course of sodium antimonyl tartrate.

I have cured patients with two injections of neostibosan given on consecutive days, but I would not recommend that course.

Finally, I do not think that any extension of the series would be justifiable.

London, W.1. L. EVERARD NAPIER.

Public Health

Future of Public-assistance Institutions

THE National Health Service Act provided for the transfer to the Minister of Health (and for administration by regional hospital boards) of those parts of public-assistance institutions used for hospital purposes, and for the apportionment of premises used partly for hospital and partly for other purposes. Since dual ownership and control might give rise to difficulties provision is being made under the National Assistance Bill for each public-assistance institution to be treated as a single unit, the future ownership and management being determined by its predominant user. There will thus be no apportionment of premises. Responsibility for the care of the sick in institutions remaining with a local authority will, however, rest with the regional board; while the care of the non-sick in institutions vesting in the Minister of Health will rest with the local authority.

In a circular (172/47) the Minister urges local authorities to determine, by negotiation with regional hospital boards, which institutions should be vested in the Minister.

Poliomyelitis

Notifications, which totalled 103 in the previous week, numbered 70 in the week ended Dec. 6. This is the first time since the week ended July 5 that notifications have been below the peak figure for 1938—85 notifications in the week ended Oct. 22. The fall from 103 to 70 maintains the more rapid decline which has been noticeable since the week ended Nov. 15; and if this rate continues notifications should be reaching the normal winter level of 4–5 cases a week by the middle or end of January.

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Infectious Disease in England and Wales

WEEK ENDED DEC. 6

Notifications.—Smallpox, 0; scarlet fever, 2027; whooping-cough, 1488; diphtheria, 205; paratyphoid, 8; typhoid, 0; measles (excluding rubella), 2799; pneumonia (primary or influenzal), 530; cerebrospinal fever, 46; poliomyelitis, 70; polioencephalitis, 6; encephalitis lethargica, 0; dysentery, 93; puerperal pyrexia, 112; ophthalmia neonatorum, 45. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from measles, 4 (0) from whooping-cough, 3 (1) from diphtheria, 59 (2) from diarrhœa and enteritis under two years, and 19 (3) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 210 (corresponding to a rate of 26 per thousand total births), including 24 in London.

Parliament

FROM THE PRESS GALLERY

Medical Practitioners and Pharmacists Bill

AT the committee stage of this Bill in the House of Commons on Dec. 9 Mr. JOHN EDWARDS, parliamentary secretary to the Ministry of Health, moved a series of amendments to clause 3 to include alien doctors, who, although they had not served in His Majesty's Forces, had given valuable service in a civilian medical capacity overseas. The Bill as amended was read the third time and passed.

QUESTION TIME

Grants to Industrial Health Research

Mr. F. J. ERROLL asked the Lord President of the Council what was the total amount of Government grants given in the last four years to the Industrial Health Research Board; the number of reports issued during the same period; and what was the future policy for the board.—Mr. H. MORRISON replied: The expenditure of the Medical Research Council on that part of their programme in which they are advised by the board amounted to £161,520 over the last four financial years. During the same period 12 reports on this work were published officially, and 46 other reports as contributions to scientific journals. The policy is to continue the expansion which has already taken place on a considerable scale since the war.

Answerable for the Regional Hospital Boards

Colonel M. STODDART-SCOTT asked the Minister of Health if the Government's decision with regard to Ministers' replies to Parliamentary inquiries about nationalised industries also referred to nationalised hospitals and the specialist and other services administered by regional hospital boards.—Mr. A. BEVAN replied: No. The Health Ministers will be answerable for these services and therefore for their administration by the local or regional bodies set up for the purpose. But it is to be hoped that the proper responsibilities of those bodies will not be diminished by too many inquiries on detailed day-to-day matters unless some point of general importance is involved.

Analgesia for Mothers

Mr. R. W. SORENSEN asked the Minister to what extent progress was being made in providing analgesia for women in confinement.—Mr. BEVAN replied: The number of cases where it was provided by domiciliary midwives increased from 7262 in 1945 to 20,507 in 1946. Also the number of midwives trained to give it has doubled in the current year. I am not yet satisfied with the progress. It is substantial but there is still a very large number unable to avail themselves of it.

Production of Audiometers

Mr. EDWARD EVANS asked the Minister whether he had arranged for the purchase of a sufficient number of pure-tone audiometers for testing purposes in the scheme for the suitable allocation of hearing-aids under the National Health Insurance Act.—Mr. BEVAN replied: I am arranging for the production of a new type of pure-tone audiometer which can be used after a short and simple training. This will be given as may be necessary to the staff of hospitals providing the service.

Obituary

ROBERT ALEXANDER FLEMING

M.A., M.D. EDIN., LL.D., F.R.C.P.E.

Dr. R. A. Fleming, the oldest fellow of the Royal College of Physicians of Edinburgh, died on Dec. 6. The son of a Dundee merchant, he was born in 1862, and from Craigmount School he entered the University of Edinburgh where he graduated M.A. in 1884, and M.B. with first-class honours four years later. In 1896 he was awarded a gold medal for his M.D. thesis.

As was the custom at that time, he was pathologist to Edinburgh Royal Infirmary for several years before he was appointed to the staff. He also lectured on the practice of medicine, and he was an examiner for Edinburgh and Aberdeen Universities. As a territorial he served in the war of 1914–18 in the 2nd Scottish General Hospital, and later, with the rank of major, was in charge of the medical division of the 42nd General Hospital at Salonika. He was a member of that select body, the King's Bodyguard for Scotland, the Royal Company of Archers, which he also served as surgeon. He became a fellow of the Royal College of Physicians of Edinburgh in 1899, and in 1928 he was elected president. In the same year the university conferred on him the degree of LL.D. He was also a fellow of the Royal Society of Edinburgh.

But perhaps the duties which gave him most pleasure and interest were his appointment as physician to the two Royal Edinburgh Hospitals for Incurables, which he visited at least once each week, always making a point of speaking to the patients, and his post as medical adviser to the Prison Department for Scotland. In visiting the prisons he showed a deep concern for the welfare and reformation of the prisoners, and for his Morison lecture of 1934 he chose as subject the Mental Element in Crimes and Criminals. Kindness and consideration for others were characteristic of the man, and he earned the affection of all with whom he came in contact. Fond of fishing and shooting, he spent much of his holidays at his shooting-lodge in Perthshire, where he went a few months ago in the hope that in country surroundings his health might improve; and there he died.

Dr. Fleming lately celebrated his golden wedding to Eleanor Mary, a daughter of the late Canon W. L. Holland, rector at Cornhill-on-Tweed. She survives him with three sons and a daughter.

THE LATE DR. BOLTON

Prof. G. Payling Wright writes: In many ways Charles Bolton was fortunate in the unconventionality of his medical training. Long before he began the formal scientific discipline, he had acquired much medical knowledge and skill in observation through his apprenticeship to a general practitioner. Having this practical experience for his background, he was suddenly thrown into the great London medical school which saw the renaissance of physiology in this country. With the problems and difficulties of practical clinical medicine he was already familiar; it was hardly surprising, therefore, that his finding in the sciences of physiology and pathology, the solutions to many of his former perplexities, should instil in him a deep urge to follow methodically in the footsteps of the active group of investigators whose steady flow of discoveries had already disclosed so much and held out even higher hopes for the future.

The large number of Bolton's contributions to medicine can only be fully appreciated by any one who has gone carefully through the list of his published writings.

While it is difficult to discriminate in value between the three main phases into which his researches fell—the complications of diphtheria, the genesis of peptic ulcers, and the pathology of œdema—it is likely that the last was the most important contribution that he made. In his study of this problem, he was fortunate in having his friend Starling's researches into lymph formation to guide him. But Bolton had a strongly independent nature, and while he fully appreciated the importance of the advances made by Cohnheim and Starling, he was unable to accept in their entirety the applicability of their conclusions to the clinical problem of

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œdema. For example, in writing of the mechanism by which experimental cardiac embarrassment leads to the formation of œdema, he stated that "the only possible conclusion to which Cohnheim could possibly have come from his experiments was that the venous pressure was high and maintained its height, and this conclusion was wrong only because his method of experiment is not strictly comparable to uncompensated heart disease." With Bolton, the animal experiment was never more than a finger-post; the quest was invariably followed to the bedside of a sick patient. Cohnheim's experiments were not comparable, Bolton believed, because they were acute and not chronic in design; so he set himself the task of producing chronic circulatory disorders, and his beautiful experiments on pericardial constriction and partial venous occlusion were the results. From these he concluded that a permanently raised venous pressure was not essential for œdema formation, but that this disorder is "primarily due to impairment or other alterations in the capillary wall"—a view since supported by many later investigators.

Collaborating with Bolton in his investigations was a stimulating experience, for in the laboratory his natural forthrightness suffered none of the inhibitions inseparable from the consulting-room and ward. But however busy he might be with his clinical work, he punctiliously set aside certain afternoons each week when nothing would draw him away from his laboratory. It was this careful arrangement of his time, throughout most of his professional life, that made it possible for him to undertake so many outside activities successfully, yet to maintain an almost unbroken series of original contributions for nearly forty years. He was versatile, too, in his technical skill—his command of experimental methods can be seen in his careful study of the pharmacological actions of an African arrow poison which he made at the request of Ray Lankester. He had unusual skill in animal surgery—the deftness of his technique contrasting strangely with his large and seemingly ungainly fingers. But in spite of his exceptional facility in such operative procedures, he always subordinated his methods to the research in view, and turned to chemical, immunological, and other techniques as the occasion required.

Bolton was a man of most kindly nature, and the open frankness of his character tended to evoke the best from all who came closely into contact with him. Away from the ward and laboratory, his main interests lay in the open air. He spent many of his holidays fishing, for he was a keen angler. His boyhood in Yorkshire, too, had left him with a deep interest in natural history and the wild life of animals, and as with so many medical men this interest had reinforced his natural gift for observation. Perhaps no higher tribute could be paid his qualities than that he had the robustness of frame, intellect, and character that is typical of the people of the countryside from which he sprang.

Births, Marriages, and Deaths

BIRTHS

ARONSON.—On Dec. 6, in London, the wife of Dr. Robert Aronson—a son.

FREEMAN.—On Dec. 8, in London, the wife of Dr. V. Freeman—a son.

HARRINGTON.—On Dec. 7, at Church Crookham, Hants, the wife of Dr. A. W. Harrington—a daughter.

HIGGITT.—On Dec. 2, in London, the wife of Dr. A. C. Higgitt—a son.

LENNIE.—On Dec. 9, at Bath, the wife of Dr. A. B. Lennie—a daughter.

STREET.—On Dec. 3, the wife of Dr. W. J. Street—a son.

MARRIAGES

LANE ROBERTS—FORD.—On Nov. 29, at Abingdon, Berks, Peter Anthony Lane Roberts, B.M., to Irina Ford.

RUSSELL—EYRE.—On Dec. 6, at Carlton Colville, Michael H. Russell, M.B., to Pamela Eyre.

WHITEHOUSE—BARKER.—On Dec. 6, in London, John Whitehouse, M.R.C.S., R.A.F.V.R., to Anne Barker.

DEATHS

ADAM.—On Dec. 10, in London, John Ewing Adam, M.D. Glasg., F.R.C.S.E., D.P.H., aged 78.

HEGARTY.—On Dec. 8, in London, Patrick Nicholas Hegarty, L.R.C.P.I.

MARRIOTT.—On Dec. 10, in London, William Marriott, M.R.C.S.

MASSON.—On Dec. 7, in London, Hamish Falconer Masson, M.A., M.B. Edin., F.R.C.S.E., aged 45.

PERROTT.—On Dec. 10, at Ilford, Essex, George Francis Donaldson Perrott, M.A. Camb., M.R.C.S.

SMITH.—On Dec. 6, at Chipping Norton, Oxon, Thomas St. Clair Smith, B.A., M.B. Camb., aged 71.

STONE.—On Dec. 9, at Dorking, William Gream Stone, M.A., D.M. Oxfd, F.R.C.S., aged 81.

Notes and News

FIRST MAKER OF CHLOROFORM

THE centenary of the discovery of chloroform anæsthesia by James Young Simpson was fitly celebrated by the University of Edinburgh a few weeks ago. Another pioneer who deserves to participate in the credit accorded to the memory of Simpson has been remembered in a little book [1] which has just appeared.

Ether was known for three centuries before it was used as an anæsthetic, and the substance chloroform antedated the anæsthetic chloroform by seventeen years. Almost simultaneously, and quite independently, chloroform was prepared by Liebig in Germany, Soubeiran in France, and Guthrie in America, in the year 1831. A priority of several months over the other two chemists is usually accorded to Dr. Samuel Guthrie, of Sacket's Harbour on Lake Ontario.

Guthrie's grandfather, James Guthrie, a Scot and a descendant of the martyr covenanter of that name, landed at Boston, and had a son and a grandson, each of whom practised medicine in Massachusetts. The grandson did not confine his attention to medicine. In the early days of his practice he set up a gunpowder mill, and there he invented the percussion cap for firearms, which soon replaced the old-fashioned and clumsy method of priming. Not content with one factory, Samuel Guthrie also conducted a distillery, and early in 1831 he mixed three pounds of chloride of lime with two gallons of whisky, and then boiled and distilled it, thus obtaining chloroform, although it was not called chloroform until several years later. Taken internally, this new liquid "appeared to be singularly grateful both to the palate and stomach, producing promptly a lively flow of animal spirits, and consequent loquacity, and leaving, after its operation, little of that depression consequent to the use of ardent spirits. For drinking, it required an equal bulk of water." Such was the report contributed by Guthrie to the *American Journal of Science and Arts*, 1831–32, and to it was appended an editorial note by Professor Silliman, expressing the hope that further experiment would show the new substance to be of value in medicine as a remedy, and not merely as a stimulant. "He would be no benefactor to his species," continued the editor, "who should add a new attraction to intoxicating spirit."

Nevertheless the liquid became known as "Guthrie's sweet whiskey"; though the discoverer declined to go to New York, where he could have made a fortune by exploiting the new-found intoxicant. He is said to have noticed that the fumes had a soporific effect upon the cats in his wood-yard, but this observation was not followed to its logical conclusion by any experiment and thus chloroform continued to be used internally for its stimulant effect in asthma and other ills, until Simpson revealed its anæsthetic properties in 1847.

Guthrie died in 1848, at the age of 66, in the home of his daughter Cynthia. He was long remembered for his kindness and generosity, and in 1888 an inscription setting forth his discoveries was placed upon a huge boulder in Washington Park, Chicago, a tribute from the Chicago Medical Society. His home, his firearms, his still, his factory, and his memorial boulder are among the illustrations of this book, but unfortunately there is no portrait of Guthrie himself: apparently his daguerreotype was never taken.

THORACOLUMBAR SPLANCHNICECTOMY

AT a meeting of the Liverpool Medical Institution on Nov. 27, Mr. F. E. STOCK said that none of the various incisions described for the operation of thoracolumbar sympathectomy had given complete satisfaction; for while exposure of the lumbar sympathetic chain was satisfactory, the view of the dorsal sympathetic chain was very poor. Fey had described an incision for the approach to the upper pole of the kidney which was made far more anteriorally than the standard kidney incisions; and after using this incision several times it was apparent that the extension of it would give a very satisfactory exposure of the lower dorsal sympathetic chain.

The incision commences just behind the posterior axillary line and passes downwards to a point just in front of the anterior superior spine. For convenience it can be made in two stages, but this is not essential. The posterior half

1. Dr. Samuel Guthrie, Discoverer of Chloroform. By J. R. PAWLING, M.D., F.A.C.P. New York: Brewster Press. 1947. Pp. 123. $3.50.

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of the incision is deepened on to the rib and the periosteum incised. The periosteum is then displaced with an elevator from the upper half of the rib and upper border. Unless the rib is to be removed (which is unnecessary) the periosteum should not be stripped any farther from the back and lower edges. On depressing the rib, fibres of the diaphragm are seen passing upwards and forwards from the front 2–3 cm., and these are divided with a knife. The anterior part of the wound is then deepened by separating the fibres of external oblique which run in the line of the wound, and dividing the fibres of internal oblique and transversus abdominis. The rib and posterior muscles are gently retracted, the kidney in its fascial capsule is displaced forwards, and the great splanchnic nerve is immediately seen piercing the crus of the diaphragm. The next step is the division of the diaphragm, the free edge of which can be seen at this stage crossing the upper part of the wound. A finger can be inserted above the diaphragm and the pleura separated from it by gentle pressure. The diaphragm is then divided with scissors approximately 1 cm. from its origin as far back as the crus where it is pierced by the splanchnic nerve. The thoracic part of the operation then commences, the pleura being displaced from the posterior chest wall by blunt dissection, as far as possible in an extra-fascial plane. This extrafascial plane can be found easily by commencing dissection at the point where the great splanchnic nerve pierces the diaphragm, but it is not always easy to remain in the plane and on several occasions the pleura has been opened. The wound is closed by re-suturing the diaphragm and closing in layers. An encircling suture is not placed around the eleventh rib as this was found to produce a pressure neuritis of the eleventh nerve.

INSTITUTE OF SOCIAL PSYCHIATRY

ABOUT fifty psychiatrists and psychiatric social workers attended a meeting of this new institute held on Nov. 15, to exchange views and experiences in running therapeutic social clubs. Dr. Noel Harris, who was in the chair, said that, from his experience, many patients had benefited from the work of these clubs. Dr. J. Bierer outlined the basic principles of social psychotherapy, and Dr. M. B. Brody asked members taking part in the discussion to deal with the following points: should social therapy be combined with group therapy; should the clubs be self-supporting—or should they be supported by hospitals or other agencies; should discharged patients from mental hospitals and patients attending outpatient departments attend the same club; should one mix people with different diagnoses with people of different intelligence and social standard; should elections often be held, and should the patients run clubs completely independently.

The following reported on the work of their clubs: Dr. Somerville (West Ham Hospital), Dr. de Maré (St. George's), Dr. Lindsay (Middlesex Colony), Dr. Blair (St. Mary's and St. Bernard's), Miss Millar (Glasgow), Dr. Fysh (Roffey Park), Dr. Sandison (Warlingham), Dr. Scott (East Ham Hospital), Miss Butcher (Phœnix Club, Kingsway), Dr. Smith (Southend Hospital), Dr. Aaron, Dr. Bevan Jones, and Miss Thompson (Runwell Hospital).

The discussion will be summarised at a further meeting to be held at Seymour Hall, Seymour Place, London, W.1, on Wednesday, Jan. 14, at 2 P.M., when the speakers will include Dr. E. B. Strauss, Dr. Bierer, Dr Donald Blair, Dr. Harris, Dr. Doris Odlum, Dr. Maxwell Jones, and Dr. Brody. Further details may be had from the Social Therapy Centre, 7, Fellows Road, N.W.3.

"THE STORY OF A SCOTTISH VOLUNTARY HOSPITAL"

"The Gentlemen dined together; drank many loyal and patriotic Toasts; and passed the Evening with cordial and rational festivity." This glimpse of opening day at the Northern Infirmary, Inverness, published in the press in Edinburgh and London 133 years ago, is typical of the intimate details which Dr. T. C. Mackenzie has woven into a fascinating narrative.[1] Careful research has yielded a wealth of material, interesting not only to the medical historian but also to sociologist and economist alike. In 1807 "$^1/_2$ year's wages to Matron" amounted to £5, while the gardener received £7 10*s*. A generation which so readily takes for granted the special hospital services to deal with mental diseases, infectious diseases, and tuberculosis receives a salutary reminder of the courageous efforts of pioneers who grappled with these problems long before local authorities and Ministries could be roused to a sense of responsibility. Reference is made to the increasingly important part played by the infirmary in the work of the Highlands and Islands (Medical Service) Board. This is a subject of special interest to readers on both sides of the Border, for there can be no doubt that the development of "H. and I." has received special attention from the architects of the National Health Service.

1. Inverness: *Northern Chronicle* Office. 1947. Pp. 284. 8*s*. 6*d*.

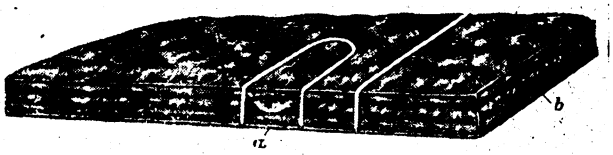
MEDICAL WAR RELIEF FUND

DURING the past year this fund has made forty-nine awards, to the value of about £11,000; and the total of all awards since the inauguration of the fund is nearly £62,000. As in the previous year, most of the applications came from ex-Service medical officers who needed temporary assistance; but the fund has continued to provide for widows and children of doctors who lost their lives in the war, and a substantial sum was voted to defray the cost of the journey to Switzerland of three parties of children of doctors killed or incapacitated in the war. Dr. C. L. Batteson has succeeded Dr. J. W. Bone as treasurer. As already announced (*Lancet*, Nov. 15, p. 743), further contributions are not being sought.

COMMODE BEDSTEAD

Messrs. Siddall and Hilton, of Sowerby Bridge, Yorkshire, write describing a bedstead designed to make easier the use of the bedpan.

This bedstead has a head and back rest, adjustable by means of a handle at the foot end. In the centre of the mesh



Mattress showing (*a*) loose piece which draws out, and (*b*) hinged piece.

is an opening strengthened with $1^1/_4 \times {}^1/_4$ in. flat iron, under which a commode can be placed, or on which a bedpan can rest.

The mattress is hinged to fit the adjustable head and back rest. The portion of the mattress over the centre piece is separate and can be drawn out by means of the loop attached (see figure).

The bedstead could be designed to fit the type of commode or bedpan in use in any hospital, and could also be adapted as a cot bedstead.

ACCIDENTS IN THE HOME

AT the congress of the Royal Society for the Prevention of Accidents, in Brighton last October, Dr. V. Freeman spoke on Accident Prevention in Relation to Preventive Medicine. His address has now been reproduced as a pamphlet, which is obtainable, price 2*s*. 6*d*., from the society, 52, Grosvenor Gardens, London, S.W.1.

University of Cambridge

On Dec. 6 the degrees of M.B., B.CHIR. were conferred in absence on G. A. Bracewell. During November the title of the degrees of M.B., B.CHIR. was conferred on L. A. Farquharson, J. K. Goodacre, G. F. Jacob, I. Kane, P. D. Kilner, R. M. Licence.

The Raymond Horton-Smith prize has been awarded to Dr. M. G. P. Stoker for his thesis on a laboratory investigation of the rickettsial diseases of India.

University of Leeds

Mr. C. R. Morris, headmaster of King Edward's School, Birmingham, has been appointed vice-chancellor of the university in succession to Mr. Mouat Jones, who retires at the end of this session.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Dec. 4, Dr. W. D. D. Small was elected president, and Dr. R. Cranston Low, Dr. L. S. P. Davidson, Dr. J. D. S. Cameron, Dr. H. L. Wallace, Dr. I. G. W. Hill, and Sir David Henderson were elected councillors for the ensuing year. Sir David Henderson was nominated vice-president.

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Royal College of Surgeons of England

At a meeting of the council of the college held on Dec. 11, with Sir Alfred Webb-Johnson, the president, in the chair, the following were elected to the fellowship in dental surgery:

H. Chapman, L. C. Attkins, W. B. Grandison, Bowdler Henry, H. H. Stones, R. Weaver, C. W. Roberts, H. G. Watkin, A. G. Allen, J. F. Pilbeam, Eleanor M. Knowles, G. H. Leatherman, G. L. Roberts, R. Cocker, P. J. Stoy, B. W. Fickling, E. L. Sheridan.

Diplomas of fellowship were granted to the following:

W. A. D. Drummond, D. D. Cranna, J. R. St. G. Stead, H. A. Pearce, N. E. James, B. S. S. Acharya, Isaac Jacobson, C. M. Squire, A. D. Bateman, R. W. Gunderson, J. N. M. Parry, G. H. A. Simmons, W. W. Wilson, N. L. Crabtree, J. C. A. Innes, A. J. S. Bell Tawse, R. C. Fuller, W. McC. Scott, H. D. S. Vellacott, R. P. M. Miles, B. H. Price, B. C. Rowlands, H. P. Guerrier, D. N. Fuller, H. O. Jones, B. W. Wells, R. C. Connolly, M. H. Wostenholm, G. A. Barclay, J. F. North, R. P. Warren, J. F. R. Bentley, J. F. N. Ward-McQuaid, W. E. S. Bain, J. R. Thompson, S. M. Chris, S. R. Mawson, P. P. Rickham, John Fry, F. I. Tovey, Ibrahim Higazi, F. V. Stonham, C. D. Clark, M. T. Greig, L. N. Bartholomeusz, J. R. Grimoldby, Jeremiah Burke, K. B. Burnside, N. C. Hughes, A. C. R. Sharp, R. E. Gibbins, K. N. McNamara, H. M. J. Windsor, K. R. Archer, J. A. Key, R. F. Lowe, E. M. Nanson, D. P. Sapsford, P. R. H. Slade, A. W. Sutherland, R. C. Willis, Sita Achaya, J. R. Addison, David Aiken, T. J. Butler, J. P. Fleming, D. McD. Kenny, K. N. Morris, Bishnupada Mukopadhaya, Jean M. Sandel, Subrata Banerjee, A. A. Brown, R. P. Jepson, Martin Laird, T. F. Miller, Ivan Barnat, Allan Hulme, L. W. Cox, K. N. Dastur, A. W. Fowler Ian Macnab, J. B. Parikh, A. E. Carter, F. G. Westgate.

Diplomas of membership were granted to R. G. Donaldson (Westminster), B. C. Luker (St. Thomas's), and G. G. Parsons (St. Thomas's), and diplomas in child health, jointly with the Royal College of Physicians, to M. B. Gamat and A. D. M. Jackson.

Royal College of Surgeons in Ireland

On Dec. 12 the fellowship was conferred on Dr. John Bunting.

The Scottish National Blood Transfusion Association

Prof. D. F. Cappell has been appointed chairman of the technical committee of the association in succession to the late Sir John Fraser.

British Postgraduate Medical Federation

The federation has awarded postgraduate travelling fellowships for 1947 to Dr. S. C. Gold, (dermatology, Switzerland and U.S.A.), Dr. A. Hargreaves (dermatology, Switzerland and U.S.A.), Mr. R. Shackman (surgery, U.S.A.), and Dr. D. B. Taylor (pharmacology, U.S.A.).

A Medical Film Unit

John Curthoys Productions have formed a medical film unit under the direction of Dr. Brian Stanford. A programme of short films and filmstrips dealing with medical subjects of interest to industrial workers, nurses, and others, has been drawn up. It is also hoped to produce a series of documentaries. The unit is willing to put its equipment and staff at the disposal of hospitals on a non-profit-making basis, when the material is required for medical instruction or research purposes.

Medical Short-service Commissions for Women

Short-service commissions are being offered to women in the medical and dental branches of the Air Force.

The commissions will be for four years' active list and four years' reserve service, with a gratuity of £600 for medical officers and £500 for dental officers payable after satisfactorily completing service on the active list. The successful applicants will be granted Air Force rank, and their rates of pay, promotion, and conditions of service will be the same as for male medical and dental officers. The upper age-limit for medical candidates is normally 30, but those who are not 32 on the date of appointment will be considered. There is no age-limit for applicants to the dental branch. Application forms may be had from the Director-General of Medical Services, Air Ministry, Awdry House, Kingsway, London, W.C.2.

Award to Ministries

On behalf of the Ministries of Health and Food, Sir Wilson Jameson, chief medical officer of the Ministry of Health, received in October a Lasker award from the American Public Health Association. The award, which takes the form of a statuette of the "Winged Victory of Samothrace," is on view at the Ministry of Health. This is the first time that the award has been given to a foreign country; and the citation, commending "the unprecedented programme of food distribution in Great Britain, with resulting improvement in the health of the people," names in particular Lord Woolton, Sir Jack Drummond, F.R.S., Sir Wilson Jameson, and Sir John Boyd Orr, F.R.S.

Tuberculosis Association

Dr. F. R. G. Heaf has been elected president of this association

St. John's Hospital, London

An appointment system for all patients will begin at this hospital for diseases of the skin on Jan. 1.

Women Dental Assistants

Guy's Hospital dental school has arranged a six-month course to train a limited number of women as dental surgery assistants. Applicants must produce certificates of proficiency in first-aid and home nursing and in secretarial work.

Grants for Old People's Homes

Since it was established in August, the National Corporation for the Care of Old People has made grants of over £133,000 towards the cost of homes and other welfare schemes for old people. Of this sum, £64,000 has come from the Lord Mayor's National Air Raid Distress Fund.

Penicillin Shortage in the United States

The United States, says B.U.P., is suffering a shortage of penicillin, which is described by Dr. Henry Welch, of the penicillin division of the Food and Drug Administration, as uncomfortable rather than serious. The shortage is ascribed to wider application, to use in larger doses, to employment in diseases of cattle, and to exports of the drug.

Ophthalmological Society of the United Kingdom

The annual congress of the society will be held at 1, Wimpole Street, London, W.1, on April 8, 9, and 10, 1948, when Dr. Macdonald Critchley, Prof. Henry Cohen, and Mr. J. H. Doggart will open a discussion on Subjective Disorders of Vision. Prof. Marc Amsler, of Zurich, will deliver the Bowman lecture. Further information may be had from the hon. secretary of the society, 45, Lincoln's Inn Fields, W.C.2.

North-East Metropolitan Region

The Representative Psychiatric Committee of the North-East Metropolitan Area which was set up last June consists of elected representatives of the medical staffs of the mental hospitals, mental-deficiency institutions, and psychiatric departments of the teaching and non-teaching general hospitals in the area. Its terms of reference are: "to consider and to concern itself with every aspect of the psychiatric services in the region," and its chairman is Dr. Henry Wilson.

Grants for Distinguished Visitors

The British Council has a small fund from which a few grants can be made to permit the attendance of foreign scientists at national or international conferences or meetings held in the United Kingdom. The grants cover subsistence or part-subsistence in the United Kingdom during the conference, and fares are not included. Applications for grants for 1948–49, which must be made by the convenors of the conference, should be sent by Jan. 31 to the administrator of the science group of the council, 3 Hanover Street, London, W.1.

Canadian Red Cross Memorial Hospital, Taplow

Mr. Ralph Marnham, director of the department of surgery, presided over an At Home for local doctors held at this hospital on Dec. 6. Sir Francis Fraser spoke on Postgraduate Medical Education at a Hospital Centre, and the wards and departments of the hospital were opened to visitors. Dr. E. G. L. Bywaters, director of the special unit for juvenile rheumatism, Dr. G. D. Hadley, director of the department of medicine, Dr. L. E. Glynn, director of the department of pathology, and other members of the medical and surgical staff of the hospital were present.

Diary of the Week

DEC. 21 TO 27

Tuesday, 23rd

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. I. Muende: Pathological demonstrations.

Appointments

BEETHAM, K. W., M.C., M.B. Edin., D.M.R.T.: radiotherapist, Hull Royal Infirmary.

BRETT, ENID, L.R.C.P.E.: M.O., Nigeria, Colonial Service.

*FAGG, C. G., M.B. Lond., M.R.C.P., D.C.H.: house-physician, The Hospital for Sick Children, Great Ormond Street, London.

* Amended notice.

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VISCERAL PAIN *

HENRY COHEN
M.D. Lpool, F.R.C.P.
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF LIVERPOOL

THE cardinal paradoxes of visceral pain spring from two long-established facts: first, that whilst pain is the commonest symptom of visceral disease, organs such as the stomach or heart when subjected to gross insults—cutting, crushing, or burning—appear to be insensitive; secondly, that pain arising from visceral disease may be located at a distance from the affected viscus, as in the left arm in heart disease or the testis in renal disease. Attempts to elucidate the enigma of visceral pain have led to investigations which fall into five groups: (1) the nature of the adequate stimulus; (2) the site of its action; (3) the distribution of pain nerve-endings in the viscera; (4) the peripheral and central nervous pathways which lead from viscus to sensorium; and (5) the "mechanisms," both physical and psychological, involved in the *reference* or *localisation* of pain.

In my Lettsomian lectures for 1944 (Cohen 1948) I have reviewed the data on these five aspects of visceral pain, traced the history of current hypotheses, and critically assessed their shortcomings. My more limited purpose here is to discuss how the intensity and localisation of visceral pain are affected by modifying the sensation of skin and deep somatic tissues.

The earliest observations in this field were recorded by Lemaire (1926). In four patients he relieved the pain of gastric ulcer and other intra-abdominal lesions by local anæsthetisation of the abdominal wall. His observations were confirmed and extended by Weiss and Davis (1928), Morley (1931), Theobald (1941), and others. These results, in the main strikingly uniform, leave no doubt that pain arising from viscera can be abolished, diminished, or differently located when the nerves of those somatic segments corresponding to the visceral nerve-supply are anæsthetised.

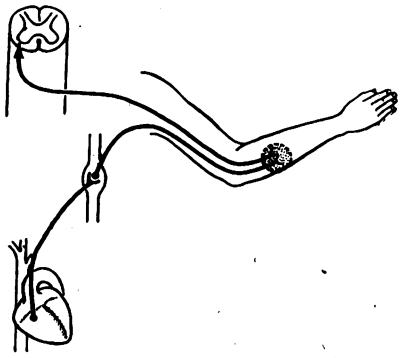

Fig. 1—Penfield's (1925) explanation of reference of anginal pain.

To explain the effects of local anæsthesia and the somatic reference of visceral pain, Penfield (1925) and Davis and Pollock (1932) have suggested that the impulses arising from a viscus cause pain by inducing peripheral changes (vascular or metabolic) which stimulate the sensory nerve-endings in the skin and deeper tissues, and that pain is then transmitted by the usual pathways (fig. 1). That this hypothesis is untenable is suggested by cases published by Wallace Jones and myself (1943). Both patients had had the left arm amputated and suffered from a phantom (figs. 2 and 3). Both, when they later developed angina, located their pain to the phantom. Such reference clearly excludes stimulation of a peripheral nerve-ending, by any mechanism, from playing a significant rôle in the genesis of visceral pain. Moreover, in both these patients anæsthetisation of the brachial plexus, care being taken to ensure that the sympathetic ganglia were unaffected, led to abolition of the arm component of angina in mild attacks, and its lessening and later appearance in severe attacks (fig. 4). The second patient had a "pin-head" neuroma at the site marked x (fig. 3), pressure on which caused anginal pain. Anæsthetisation of the neuroma abolished the arm component of the angina on mild effort. The evidence is now overwhelming that interruption of nerve paths between the periphery and the central nervous system in those somatic segments which are homologous with those of the diseased viscus abolishes or diminishes the pain or modifies the time of its appearance.

EFFECTS OF INCREASED SENSITIVITY

But the contrary influence of *increased* sensitivity of somatic tissues on visceral pain also has to be considered. It is within the experience of all clinicians that constriction of the left arm with a sphygmomanometer band may excite an anginal attack, but the possibility of the

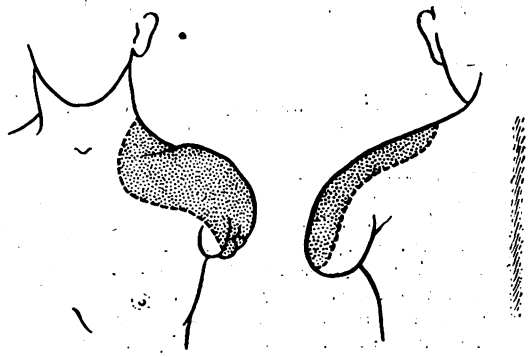

Fig. 2—Area of anæsthesia produced by left brachial-plexus block in patient whose left arm had been amputated.

cause lying in reflex coronary vasoconstriction cannot here be excluded with certainty. Stronger evidence is afforded by many cases, of which the following is typical.

A patient with three years' history of effort angina referred his pain to the substernal region. He fractured his left elbow, which when fixed in plaster was free from spontaneous pain; but for several weeks after the injury walking brought on pain in the damaged elbow, followed by substernal oppression and a sensation of constriction of the chest.

These clinical observations led to a trial of the effects of experimentally induced hyperæsthesia in superficial and deep somatic tissues on visceral pain. Four patients with effort angina were blistered over an area of 4 sq. in. with a vesicant plaster on the inner side of the right elbow or the right mammary region, where they had not previously experienced pain (fig. 5*a*). When their angina was excited by exertion, all complained early of intensification of pain in the blistered area. In three of these patients 2 ml. of 5% saline was injected into the back muscles 2 in. to the right of the 5th dorsal spine (fig. 5*b*); this gave rise to a diffuse deep-seated pain

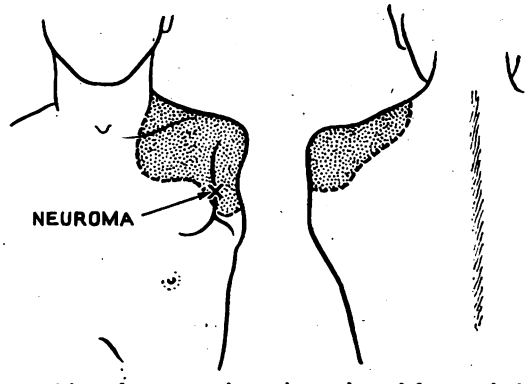

Fig. 3—Position of neuroma in patient whose left arm had been amputated.

* A paper read at the International Conference of Physicians, London, on Sept. 12, 1947.

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with vague boundaries. Two hours later, when the pain so induced had passed, exertion caused its reappearance, though no pain had in previous anginal attacks been felt in this area. The patients chosen for these clinical experiments were intelligent and coöperative, and I exclude unconscious suggestion on my part from playing any part in the results.

DISCUSSION

It is evident that the blocking of peripheral pathways diminishes, whereas the sensitisation of somatic

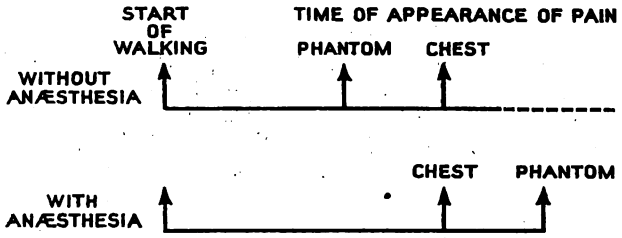

Fig. 4—Relative times of appearance of pain in chest and phantom limb before and after brachial-plexus block.

tissues increases, the ease with which pain of visceral origin is excited. What is the implication of these findings on the postulated mechanism for visceral pain? Clearly the older theories, and the more recent suggestions of facilitation by convergence (Ruch 1947), must be abandoned. Two hypotheses remain to be considered: (1) that visceral stimuli may lower the central threshold to peripheral stimuli (as in the classical Ross-Mackenzie hypothesis), or peripheral stimuli may lower the central threshold to visceral impulses; and (2) that the peripheral stimuli augment those from the viscera. Both Theobald (1941) and Jones (1943) have suggested that a principle of summation of stimuli may be involved in visceral pain, but neither has faced the inevitable corollary which I suggest must be postulated if we are to present a consistent hypothesis. This is that from the endings of all pain nerves, visceral and somatic, there arises normally a constant regular stream of subliminal impulses which pass to the central nervous system. It is true that no neurophysiologist has produced evidence supporting this inference, but none has as yet applied himself to the problem. Sarah Tower (1943) has, however, observed spontaneous and rhythmic discharges in pain fibres and terminals, of 1–8 a second, sometimes for hours. If this be accepted as normal, many hitherto irreconcilable observations on visceral pain can be reasonably explained. Normally these impulses are subliminal; they do not cause pain unless disease lowers the threshold. This raises the question of whether there is an organic peripheral component of the pains which the hypersensitive neurotic feels "all over the body." Pain impulses from a viscus which are augmented in intensity will pass the threshold only if, whether alone or supplemented by those impulses normally arising from homosegmental somatic structures, they exceed the threshold value. This may be expressed symbolically thus:

Let K = threshold for pain, A = normal stream of impulses from somatic tissues, and B = normal stream of impulses from homosegmental viscera.

Then A + B is normally less than K; but K may be exceeded if (1) A is increased, as in pressure on neuroma of amputation scar; (2) B is increased, as in cardiac ischæmia; or (3) A and B are increased, as in the concurrence of cardiac ischæmia and subdeltoid bursitis.

Almost constantly pain of visceral origin is referred to an area which shares with the viscus a common segmental innervation. This homologous segmental reference of visceral pain, first suggested by Martyn (1864) and profitably used by Head (1893) in mapping out the segmental nerve-supply to the viscera, was beautifully demonstrated by Lewis and Kellgren (1939), who emphasised the artificiality of the supposed distinction between visceral and somatic pain. Since the metamere is the phylogenetic unit of the organism, and since the arrangement of pain fibres in cord, brain-stem, and thalamus is segmental, it is highly probable that pain impulses arising from the same segment will reach a functionally related area of the sensorium, and, when integrated with the cortical pattern of the body image by neural mechanisms at present largely unknown, will be localised selectively in that segment. There is now considerable evidence showing that with repeated stimulation such localisation becomes more precise (Wolf and Wolff 1943), thus suggesting that there is an inborn faculty for a vague segmental localisation of deep and visceral pain (else why the fairly constant localisation of referred pain in angina and biliary colic?) which is amenable to learning by experience.

The explanation of the effects of local anæsthesia and hyperæsthesia is, on the hypothesis here presented, clear. If, on the one hand, the normal impulses streaming up the somatic-pain nerves contribute significantly to the sum of pain impulses necessary to pass the threshold, nerve block will abolish the pain; if, on the other hand, the impulses arising from the viscus are above threshold value, the block may diminish the intensity of the pain or alter its maximal site or course of development, but will not abolish it.

This hypothesis has the additional merit of explaining the more frequent failure of subcutaneous nerve block to lessen visceral pain, as contrasted with segmental nerve block. "Without hypothesis," wrote Charles Darwin, "there can be no useful observation." The

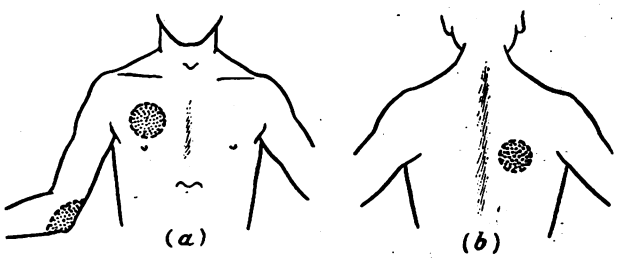

Fig. 5—Areas of experimental hyperæsthesia: (a) by blistering; (b) by injection of hypertonic saline.

hypothesis here presented will be supported or discarded when evidence is forthcoming from the neurophysiologist on the validity of the assumption that normally there is a constant centripetal stream of subliminal impulses from the nerve-endings for pain in all tissues. On him rests the burden of proof.

SUMMARY

Referred pain of visceral origin can be abolished or diminished, or its location may be changed by anæsthesia of homosegmental areas.

It can also be produced, increased, or moved by hyperæsthesia of homosegmental areas.

The explanation of these two facts seems to be that there is a constant stream of subliminal impulses from visceral and somatic nerve-endings to the central nervous system.

Normally the sum of such visceral and somatic impulses is subliminal. The threshold value is exceeded, and pain is caused, only by the abnormal increase of either one or both of these two kinds of impulse.

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A COMPREHENSIVE STUDENT-HEALTH SERVICE

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THERE should, in my view, be a full student-health service in every university. Complete health examinations on entry and in subsequent years are not enough; the service should include care of the student when he is sick or needs medical attention of any sort, and, based on these two, a careful inquiry into the factors which affect mental and physical health in this particular age and occupational group.

The students are likely to be more interested in, and to make fuller use of, a service which looks after their troubles and illnesses and, to their way of thinking, has a practical value than one which they may rightly or wrongly suspect of using them as subjects of a statistical inquiry. Without such a service it is difficult to see where accurate information about morbidity, necessary for the assessment of the health and sickness of any group, is to come from.

It is when students are sick and seeking help in trouble that one gets the best insight into their background. In some cases it is the only time when one will get to know anything at all of the more intimate affairs which can have such an important bearing on their mental and physical make-up. I have found that replies to stereotyped questionaries, particularly written ones, are often inaccurate and misleading. A glaring example of this is the replies made to the question: "What games do you play and what form of exercise do you take?" A student will fill in rugby, tennis, rowing, hiking, swimming, squash, badminton, cricket, country dancing, and hill climbing, when what he means is that he has done each of these things once and, since coming to the university, has taken practically no physical exercise at all.

If the student cannot be relied on to answer such simple questions as these accurately, still less valuable will be his replies to more intimate inquiries. In the ordinary way of examination it is very hard to get "inside" a student or to find out much of what constitutes his social and environmental background. This may apply more to the northern Scotsman with whom I have had to deal, but with any group of students it is important to ensure that information given on what are often delicate matters is truly representative before reducing it to figures. As a means to obtaining really valuable information, the doctor-patient relationship should be developed rather than the impersonal stereotyped questionnaire.

It is very important that the physician in charge of the student service should have an absorbing interest in and liking for his work. A long series of routine examinations is apt to become very tiring, and indeed boring, to the detriment of the standard of work. It will prove much more interesting if the day is enlivened with the care and treatment of sick students, and the health examination will mean a great deal more if it is to be the basis of possible further personal care. The physician should be able to feel that he is in a position to carry out, from start to finish, the very highest standard of medical work. This surely is a sine qua non of a university service, and it will not be achieved if the service is broken or disjointed, or the physician's interest is subjected to the strains of a too limited routine.

THE ABERDEEN SCHEME

Aberdeen University and the Aberdeen Royal Infirmary came together to make the student-health service a combined undertaking. The physician in charge is expected to deal with the nurses and residents of the hospital in the same comprehensive way as he does with university students. To regularise the position the holder of the appointment has been appointed to the staff as assistant physician in charge of the nurses' health service and has charge of a flat of small wards totalling 20 beds. The flat was designed primarily for the use of sick nurses, but students, both male and female, can be admitted if there is room. The appointment is useful in that it enables the physician to retain the care of students and nurses requiring hospital treatment or investigation, and puts him in closer touch with other members of the hospital staff, on whom he can call as required, than would otherwise be the case.

The retention of the personal care of the student throughout the whole period of his illness constitutes an important element of the service. To hand him over to some other person or to an institution when the need for contact is greatest would surely infringe the principle, so strongly emphasised in social medicine, of dealing with the individual and the group, in health and in sickness, as a whole being and a whole group.

The accommodation in the University buildings consisted at first of two rooms, but this is now being increased to four:

(1) Consulting and examination room.
(2) Treatment room and laboratory.
(3) Office.
(4) Reception and waiting room.

This must be regarded as a minimal requirement.

The day's routine is generally as follows:

I go at 9 A.M. to the Royal Infirmary to see the nurses and do a round of bed cases. I also see what one might call "outpatients." The time taken varies, but is usually between 1 and $1^1/_2$ hours.

No health examinations are done at this time; they are done by appointment as soon as possible after the arrival of each batch of nurses. These examinations are carried out in the nurses' home where their own teaching is done, and which, consequently, is fairly well equipped for the purpose.

From the Infirmary I go to the University buildings about two miles away, where I first of all see "outpatients," and then pay any necessary outdoor visits to students in their lodgings. I often return to their lodgings in the evenings to deal with the cases more thoroughly, and find that the necessary intimate relationship is better achieved at this than at any other time.

Routine health examinations of university students are also done by appointment. This is rather an important point. Each student is invited to make an appointment. This avoids interference with lectures and gives the student no excuse for not attending.

The health examination is fairly comprehensive, including a history of previous illness, family history, amount and kind of exercise, interests and hobbies, standard of lodgings as regards accommodation, food, suitability for work, price, &c.; a dark-room examination of ear, nose, mouth, throat, and fundus oculi; tests of visual acuity and colour-vision; clinical assessment of nutrition, posture, and development; hæmoglobin examination, radiography of chest, and examination of urine; and a general examination. An electrocardiograph will be utilised when a machine is available. Particular attention is paid to such things as dental caries, infected tonsils, chronic nasal catarrh and sinusitis, errors of

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refraction and muscle balance, postural defects, skin eruptions, hæmorrhoids, varicose veins, defects of locomotion, and moderate degrees of anæmia, conditions which are apt to be neglected or to have their treatment postponed, but which if tackled early can prevent later trouble. Special care is directed to ingrowing toenails, flat-foot, hammer-toes, and other deformities, and to trophic conditions, chilblains, and erythrocyanosis. The nurse inquires particularly regarding menstrual disorders; and, by arrangement with the professor of gynæcology, all such cases are referred to his department for thorough investigation by a woman doctor.

All defects found which require further specialist examination and treatment are referred to the special departments of the Royal Infirmary. The honorary staff are extremely helpful, the specialists concerned affording students reasonable priority and sending useful reports on their cases. Radiography is done at the Royal Infirmary at certain fixed times daily.

Arrangements for dental treatment are not yet comprehensive. Particular cases, such as dental cysts and impacted teeth, are referred to the dental surgeon on the staff of the Royal Infirmary; for ordinary treatment they go to local dental practitioners. Psychological cases are referred to the mental-health department of the Royal Infirmary. Cases of underdevelopment and postural defects are referred to the director of physical training. All findings, together with specialists' reports, are recorded on a punch-system record-card and filed under appropriate headings for easy reference.

PHYSICAL EXERCISE

I have been astonished at the number of students who take no outdoor exercise at all. The percentage of those who do not take enough exercise is very high, about 80% of those examined, and of this group a considerable number appear to have no sort of hobby or interest outside their work as students. This is surely a serious matter. It is not the physician's concern to take part in producing athletic champions, but he should be concerned to see that those who are not able to secure a place in the first and second teams should be able to enjoy periodically a vigorous healthy game or other exercise.

It is generally agreed that young people in this age-group should have plenty of opportunity for letting off steam in exercise of one kind or another. Those who do not like games can seek other forms of recreation, but it should be in the open air. This applies particularly to students whose work is essentially indoors and sedentary, sitting in class-rooms, looking down microscopes, standing round a bed or in the operating-theatre. I feel that many of the student's troubles would disappear if his life were better balanced and he took more physical exercise. No university health service is complete which does not deal with this important aspect of student health. My own contact with the athletic union is not so close as it should be, but I hope to come to some arrangement whereby I can achieve a measure of "direction" towards the playing-fields or the open country for those students who at present lack the opportunity.

ORGANISATION

The University of Aberdeen has been generous about equipment, but the question of supply has been difficult and my rooms are not yet completely equipped. Accommodation and equipment should be adequate if the health service is to attain the high standard consistent with a university service; no physician can put out his best work if he is handicapped in this respect.

As regards the cost of treatment, a student admitted to the Royal Infirmary or attending a special department is dealt with in exactly the same way as other patients. The University has laid down that it "will only accept minor financial responsibility in connexion with the treatment of students." This leaves a good deal to the interpretation, and I have taken it that the University will cover the cost of what I use in the treatment room, but that the student must pay for any drugs and dressings he may require for use in his home or lodgings. There are several funds at the disposal of the University authorities designed to help necessitous students in sickness, but they can be called on only for serious cases and do not cover the sundry small sums required in the ordinary way. Such things as sulphonamides and most of the useful remedies and dressings can make quite a bite into a student's weekly pocket-money, but it is surprising how rarely it is necessary to prescribe drugs; and, as regards dressings, students who are coming to the University every day can easily call in at the treatment room, where the nurse will do their dressings for them. Under the Health Act all sickness costs will be met.

The staff at the University centre consists at present of myself and a nurse-secretary. If the work increases it may be necessary to have a nurse and a secretary. The flat at the Royal Infirmary is in charge of a permanent nursing sister, and the nurses are found and changed in the ordinary way by the Infirmary authorities.

To what extent can this staff and the arrangements which I have outlined meet the need for the yearly routine health examination of all students in the University, in addition to their care in sickness? In other words, are they sufficient for a comprehensive service? The problem is largely mathematical and depends to some extent on the number of students coming for examination.

It takes a minimum of 40 min. to examine a student properly. Allowing for the time necessary to visit the Infirmary in the morning, often again in the evening, and for occasional return visits to see members of the staff, &c., to deal with sick students and visit them in their lodgings, and for sundry distractions incidental to the service, I can examine, on an average, 6 cases a day, or about 30 a week.

There are three full terms of about 9 weeks ..	810
In the Christmas and Easter vacations it would be possible to examine a further 100 students resident locally	100
About 150 medical students come up for vacation terms in their last 2 years of study	150
	1060

This is probably the maximum of examinations which could be carried out by one whole-time physician, and to do this he would require an efficient nurse or an assistant capable of doing some accurate technical work such as examination of urine, Hb estimations, electrocardiography, &c., and a secretary. With any larger number than this there would be no alternative to increasing the staff. The numbers dealt with could, however, be more than doubled if two full-time physicians were employed, since there would not be the same distraction and break in the work. Examinations subsequent to the first do not occupy so much time, and half-hourly appointments could be made. Two physicians, with additional accommodation, could manage 2500 examinations yearly.

In Aberdeen University there are, in the present year, 1822 matriculated students; hence one physician could not carry out the work of a full medical service on the basis of a yearly examination of all students. Should examinations be limited to first-year and third-year students in all faculties, and fifth-year and final-year medical students, the number to be examined next year would be about 1050. I consider that one physician could do this and look after sick students also, but the numbers in the third and subsequent years are likely to increase after next year.

At present health examinations are compulsory only for medical students, who have to be examined three times during their course, and voluntary for all others.

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The number of non-medical students likely to volunteer cannot yet be estimated, since in this broken year I have only been able to approach those in their first year; of these 28% requested examination and were examined. Taking 30% as a likely response for all non-medical students, the number of examinations, on a yearly basis, would be about 1050 on this year's figures, with, in addition, 75–100 nurses.

The examination of the nurses can be carried out more quickly than that of the students, because the examinations are done in the nurses' home, where they are paraded and prepared—i.e., they are brought in one after another in dressing-gowns. The sister tutors also are able to help considerably with measurements of height and weight, examination of urine, &c.

There is a striking difference between the university student and the student nurse. The nurse is more carefree and less worried. She is governed completely from the time she enters hospital, her day's work and her hours of recreation are planned, her quarters and meals provided, she wears a particular kind of clothing, and she subjugates herself entirely to hospital discipline. She has little privacy, even in illness; she reports sick through the matron, is conducted to the doctor by a sister, and full information of her condition goes back to matron and to her family. Her studies are carefully supervised. She receives a wage sufficient for her immediate needs. In fact, her behaviour generally is ordered and she has relatively little to worry about.

The university student is much more intense, more inclined to introspection and worry. His course of study is planned, but it is a much more exacting affair than the nurse's. He is very much more on his own (indeed I have found that the student can be a very lonely person) and has nothing provided in the way the nurse has. He receives no salary and is often hard put to it to make ends meet.

Because of the difference between these groups I am a little doubtful at the moment of the value of incorporating the care of student nurses in a university student-health service, but must reserve opinion pending further experience, or pending a change in the training of nurses.

COMMENTS

The preventive value of the service is beyond question. It is obviously of the first importance that students of all faculties should be able to continue their studies unbroken by sickness. It is also very important that, if sick, they should be made sufficiently well to sit examinations at the proper time. One fascinating element of the work lies in the frequent efforts to effect a cure against time. Life at a university ought to be, and I think usually is, for the student a happy and healthy time. On the other hand, the conditions which students make for themselves can be very depressing both mentally and physically. The fog-banks ahead in the form of examinations, the feeling that one is not keeping pace with the teaching, the abandonment of physical exercise to devote more time to work, the effort to put in more hours of reading continuing into the "wee sma' hours," the subsequent heaviness on waking and the scramble to get to the first lectures in time, the consequent irregularity of bowel movement, bad landladies, uncomfortable "digs," poor food, and often financial stringency, all these and other factors are common in a student's life and do not make for fitness.

Clear sound advice, especially insistence on the need for engaging in sport or taking exercise in some suitable form, and its value as a means of mental relaxation, on the value of the weekend and of the vacation, the correction of headaches and eye strain and of other small but important defects, the assurance that certain sexual disturbances are of small significance, and in many cases just letting the student unburden himself—all these can do a great deal to assist him to come fresh to his final examinations and fit to face whatever the world has in store for him thereafter.

My main criticism of the service is that it will be incomplete until health examination is made compulsory not only for medical students but also for students of all faculties. Though to many people the idea of compulsion is distasteful, I am strongly in favour of making a complete medical examination compulsory for all students. In this free country compulsion enters so largely into our lives that I cannot believe there would be any difficulty about it; nor is there any evidence that students themselves would resent it. So far as medical students are concerned, they all come along in a cheerful frame of mind, and I have not met one who showed resentment at having to be examined. The reason why more students do not present themselves voluntarily is that they "cannot be bothered"—the common evasion of these often casual young people.

Another reason which tends to make the service incomplete, and one which must affect the statistical analysis, is that in Aberdeen (and I suppose the same applies to most universities other than Oxford and Cambridge) many students live with their parents in the town and, when ill, consult their own family doctor. In fact the terms of employment of the physician are that he will attend "those students whose homes are not in Aberdeen" and are living in lodgings. Some students, however, who have family doctors in Aberdeen consult the University service for treatment. I take the opportunity of examining all who come, from whatever source, very thoroughly. Minor ailments are dealt with on the spot; with regard to anything more serious, I make a point of getting in touch with the practitioners concerned, some of whom ask me to deal with the case; others treat the student and keep me informed, but in a few cases I lose touch completely. As an example, a case of early pulmonary tuberculosis detected on routine examination was referred to his own doctor, who elected to deal with him, and I have not been able to get an accurate report on his progress. On the whole, however, the practitioners in Aberdeen are friendly and coöperative, and some of them who are consulted direct refer cases to me or tell me about them. The situation constitutes a potential source of leakage, and I see no way to overcome it other than by seeking to maintain friendly relations with all concerned. The University chaplain and the supervisor of women students sometimes hear of sick students when I do not, and are helpful in putting me in touch with cases.

Though a student-health service has been in operation in Aberdeen for some time, the present full-time service is in its infancy, and experience so far may not be a complete guide. The fact that the service has not been well known to students, difficulties in obtaining equipment, and other things have affected the work, and the experience of at least another full academic year will probably be required before one can speak in exact terms of what can be done.

CONCLUSIONS

The student-health service should, so far as possible, be complete.

The provision of medical care—i.e., involving the full doctor-patient relationship—affords the best means of getting complete and accurate records of the social and environmental background and of individual histories.

There should be a sanatorium or special accommodation in hospital for students, and it is desirable that the physician in charge of the service should have charge of this.

A full-time physician in charge of a full service can carry out 1000 examinations per year.

The examination should be compulsory for students of all faculties.

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COMPULSORY PHYSICAL EDUCATION FOR UNIVERSITY STUDENTS

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IF its more specified purposes are set aside, university education may be considered as the ordered pursuit of advanced knowledge and techniques, with a bias towards contemporary social purpose. The subject of this paper is simply the physical aspect of this pursuit so far as it affects the undergraduate.

It will help first to consider briefly the whole field of physical education and compare it with the parallel stages of an intellectual discipline. Thus, the primary stage may be said to correspond with the acquisition of the techniques of reading, writing, and arithmetic. The child learns elementary bodily coördination in an environment governed by simple natural laws. Running, jumping, throwing, and climbing are the primitive skills at this stage, but one may add catching, floating in water, or bouncing, to illustrate the gradually increasing perplexity of the natural forces involved.

The secondary stage, which follows the acquisition of "physical literacy," is the stage of "tools and conventions." Just as, intellectually, the child uses the tools of mathematics and language to broaden its skill and assimilate previous human experience in relation to present needs, so physically he starts to use the tools which relate him to more complex natural forces, and to learn the conventions of contemporary games. For instance, he may use a bat, a swing, skates, skis, a springboard, or a sail to play off one physical force against another to serve his purpose, much as the budding craftsman learns how the momentum of a mallet and the cutting end of a chisel combine to produce the configuration of wood which he requires. And he must also learn the rules of games whereby he relates his skill to that of others, coöperating with or outwitting his fellows in turn.

By the time the university stage is reached, the student should have acquired both elementary skill and experience. The next stage is to be regarded as one of differentiation rather than growth. The student should know his or her capabilities and be able to specialise to some extent in those pursuits to which he or she is temperamentally or physically best suited. But at the same time a new characteristic tends to emerge—that of social maturity. Thus, while skill may be specialised, character is broadened. Instead of playing football when football is laid on for him, he plays, if he is keen, as a member of a club, and the running and fortunes of the club become partly his concern. The physical skill is thus related to social function. Courts must be booked, expeditions organised, the hard work of maintaining equipment and taking turns in the use of it bring valuable qualities to the fore in addition to the much vaunted team spirit. Moreover, purely social contacts mature from these associations and are complementary to those fostered simultaneously by kindred intellectual pursuits or communal living conditions. In the desire to arouse the interest of others and encourage their skill is discovered the germ of the teaching attitude.

This brief analysis, the divisions within which are very arbitrary, shows the lines on which an ideal university physical-education department might work. It should provide for the integration of physical activity with personality and society on as broad a basis as possible, without detriment to an ordered freedom consonant with the university attitude. It makes three basic demands: freshmen with elementary skill and secondary experience; ample and varied equipment; and "academic" standards of teaching and opportunity.

DEFECTS OF VOLUNTARY SYSTEM

At this point we come to the three major difficulties inherent in this utopian project, for in practice we find many freshmen with no experience and some even with no elementary skill. We find also equipment that is ample in only a few narrow fields and entirely lacking in others; while the teaching, where there is any, can seldom by any stretch of the imagination be considered as of academic standard.

These three difficulties relate ultimately to one another; the poor quality of teaching with few facilities in the schools allows the physical illiterates to reach the university, which in turn has no standards of its own. That this vicious circle is overlooked must be attributed in large measure to the voluntary system which fosters the emergence of the ready-skilled few and stifles the moderate potential of the many.

This voluntary system is voluntary only in name, for the student is—at least in some older universities—virtually compelled to contribute a considerable subscription to the sports funds, which are all spent on the pursuits of rowing, cricket, and football. If by inclination or time-table these are not feasible in his case, he is destined to fend for himself in the open market of an overcrowded and ill-provided town. Let us accept that this is a bad old tradition. But the tradition of the younger universities is no better, for here the idea seems to have been that anything the student did, or did not do, out of academic hours was no concern of the university. These various traditions at present combine in depriving something approaching 90% of all university students of adequate physical opportunity.

WIDER CHOICE WITH COMPULSION

If we are to overcome inertia in this matter and catch up with the times, a complete change of attitude will be necessary. Education for the body as well as the mind must become a concern of the universities, and my own view, supported by experience, favours the introduction of compulsory physical activities for all first-year students. I have changed my mind in this matter in the last two years, and I hope to persuade those who disagree to change theirs, for I have seen what has already been accomplished by this means by my colleague A. D. Munrow, director of physical education at Birmingham University, to whom I owe many of the views here advocated. It is his experience that the compulsion falls far more heavily on the university authorities than on the student. He has, for instance, had to be provided with increased facilities, a threefold increase in his original staff, and adequate time from the curriculum hours for physical activity. He is, I need hardly say, possessed of considerable vision and powers of inspiration, and has collected first-rate assistants, but he found that the old system gave him no opportunity to realise his ideas. The choice provided is large and the system is popular; it interferes in no way with the usual games and sports run by student organisations whose regular players can contract out of the compulsory periods if they wish.

The alternatives include camping, rock-climbing, folk-dancing, and gymnastics; and, during the past hard winter, skis were obtained from Government surplus stores, and cross-country expeditions were organised. The social value of physical education, thus broadly conceived, is one of its major assets.

The native resentment to compulsion is, after all, something of a bogy. We compel students to attend their courses, once chosen; and we often compel residence in halls or colleges, and conformity with a host of regulations for the sake of equable community living. Why should we not also compel a health-promoting régime for the same reason? If compulsion is so bad for the body, is it not worse for the mind?

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Compulsory physical education is not likely to be adopted immediately by all universities; it is in an experimental stage and merely represents one view of future developments. For one thing, there is at present no adequate staff available of the required quality. Physical education has suffered badly from dogmatism; rigid systems have been built up on unproved hypotheses, and often applied in unsuitable conditions. Much of my time is given to contradicting the false theory that permeates the textbooks. The products of physical-training colleges are too often narrow-minded; and though some of these colleges have doubtless done valuable pioneering work, they seem to cling to systems of drill and gymnastics, founded on mythical principles, with unswerving tenacity. We need a much more liberal and scientific attitude in this matter.

It is to be hoped that other British universities will accept physical education as a subject worthy of a place beside purely intellectual subjects in a general degree course, and thereby encourage some of those gifted young men and women who combine physical and intellectual skill to take up a career that provides a field for both. For, surely, physical education is both a means and an end in itself, like any other branch of education; its merits, alike for the individual and society, must equally be taken for granted and not tied to any particular physiological hypothesis. The objective of both bodily and mental training is the better education of the "whole man." Of two equally erudite professors, the one who plays squash or can dance a foursome reel is the better product.

Let us therefore see that our universities set about providing for a much wider range of physical skills: not only field and court games but all-the-year-round swimming and diving; dance, both traditional and contemporary; not only athletics and gymnastics but also skating, ski-ing, gliding, and sailing; not only S.T.C. camps but expeditions for adventure, mountaineering, and canoeing. These are all worth-while activities whose virtues are not in question among those who pursue them or those who have given time and thought to their encouragement. Can we doctors honestly say that we know any better?

HEALTH EXAMINATIONS OF STUDENTS

PILOT SURVEY IN OXFORD

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THE purpose of this communication is to relate experience of a pilot survey of student health carried out during the first two terms in 1947 at Oxford, and to examine in the light of this experience what degree of success student-health examinations may expect, and what the limitations of this method are in practice.

The scheme which operates at Magdalen and Somerville is designed to provide health examinations and a health advisory service for the undergraduates of these colleges and to carry out a long-term study of their health. The physician in charge does not undertake treatment, except in so far as explanation and reassurance may be necessary. The specialist services at Oxford have been of great help from the beginning. Good ancillary services are available at most universities, but it should be emphasised that for each student in need of treatment in term time at least an equal number have minor anxieties or need advice on general lines. There are consequently many opportunities of usefulness to be found by a medical adviser who is independent in the student's mind of parental, tutorial, or disciplinary relationship and can be consulted at any time without additional cost.

During Hilary and Trinity terms this year 155 students were examined on a voluntary basis, 77 from Magdalen and 78 from Somerville. This represents 60% of first-year men and 66% of first-year women to whom the invitation to join was sent. Rather more were seen in Hilary than Trinity term, when pleasanter outside diversions abound, and the response among first-year students was rather higher than among those in their second year.

The ideal time for the first approach appears to be just before arrival in the first year, before the students are bombarded with political and other circulars. Though this early approach was made impossible by starting in January, the response may be regarded as encouraging; unfortunately it is insufficient to yield a representative survey of the two colleges, and it is doubtful whether this is possible on a voluntary basis.

Experience elsewhere has led to the recommendation of compulsory medical examination. Medical examination should not constitute an extra condition of entry to university life; nor should it ever appear to influence a student's progress at the university adversely. On the contrary, it offers benefits, such as the early recognition of serious and remediable illness and the correction of minor defects which can interfere with work and enjoyment. A fair number of undergraduates have volunteered the view that health examination should be compulsory, and if the opposition to this is greater in senior than in junior common-rooms it is believed to arise in part from a fear of making neurotic students. Experience in the fighting services does not confirm this conjecture, and the work of the M.O. in support of morale is well recognised. It is no part of the design of the scheme to pander to moral weakness, or to recommend as a rule deep delving of a psycho-analytical type, except in the rare instances in which such specialist help may prove necessary. Far more often opportunity is found to relieve anxiety at an early stage.

Another fear is that further filching of the personal liberties of the individual may be attempted, an ugly enough symptom which is thought to be extending today. Health examination at the university is surely no more of an infringement of this liberty than are the recognised services of the school doctor, of whose work it is a logical extension, and it is even less of an infringement than in the case of the medical services of the fighting forces, where medical examination at entry may prove a dispiriting bar to opportunity.

Further, in the student-health scheme no outside loyalty need exist which might influence the relationship between student and doctor. When fully established in university life it seems more probable that the doctor may find that he has to resist pressure by college or university administration to open the medical back-door in the case of students failing to profit or for other reasons undesirable.

The great advantages of compulsion are (1) the assurance that so far as possible all handicaps are discovered and dealt with; and (2) the information which becomes available concerning the health and sickness experience of students would be representative. For study purposes and for the planning of health apparatus in general a fair sample then replaces one in which other non-random methods of selection have occurred.

FINDINGS OF PILOT SURVEY

For those still in doubt of the need for student-health supervision, perhaps the findings in this pilot survey at Oxford may provide convincing evidence. They record many minor and remediable disabilities and not a few serious illnesses among 155 students, in spite of the belief that as a group they should represent one of the healthiest sections of the community. Altogether of 155 students, 23 (15%) were deemed to need treatment

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before the end of term; in another 61 (39%) it could be postponed till the vacation.

Among the more important abnormalities discovered by the survey of 155 students were:

(1) One case of open pulmonary tuberculosis, and another with pleural effusion and tuberculous foci. Notification of the first led to discovery of a younger brother with active infection. From a public-health point of view isolation of infective cases is clearly desirable, and yet at present a medical officer of health may have knowledge of such cases in a university population but lack the liberty to inform college authorities.

(2) Systolic murmur because of which activities had been limited ten years previously. Reassurance led to full restoration.

(3) Attacks of abdominal pain requiring investigation. Follow-up examination of amœbic dysentery and sprue.

(4) Iron-deficiency anæmia (two cases, Hb 55%, Hb 76%).

(5) Polyarthritis secondary to nasal polypi and sinus infection. Osteochondritis of lumbar spine with symptoms. Internal derangement of the knee. Recurrent dislocation of the shoulder.

(6) Transient inferior rectus palsy, with diplopia.

(7) Twenty cases of minor anxiety open to relief by explanation and reassurance.

The accompanying table of classified findings indicates which abnormalities are most common. Dental care on the whole was good, but the number of students recognised to be in need of dental treatment might well have been higher had probe and minor examinations been carried out by a dental surgeon. About three-quarters of those with errors of refraction had already been diagnosed, but annual re-examination may bring to light some progress in these defects. A family history of migraine, asthma, or eczema was present in 28%.

AIMS OF STUDENT-HEALTH EXAMINATION

Apart from assessments which lead to the removal of physical handicaps, the aims of the health examination must be concerned in some degree with the assessment of personality and those social conditions which control a student's life. If suitable records are devised, especially if certain evidence relating to background and upbringing is included, it will become possible in time to determine the influence of factors such as social origin, family history, previous illness and constitutional tendency, "only childism" (more than 1 in 5 of recent entries at Oxford have been only children), economic status, type of schooling, nature of lodging, opportunity for physical exercise and hours spent in daily travel, and to plot the bearing of such factors on health and successful use of university opportunity. Such records should also provide evidence from which advice on community problems of diet, lodgings, work, and recreation may be given, and furnish indications about the most profitable aspects of physical or mental hygiene to treat in lectures. There is, however, one important aspect in the making of such records which should not be neglected. It is desirable to shape, with the assistance of the statistician and expert records officer, a form which might become general in all universities, providing certain basic information of a factual kind in a manner readily susceptible of analysis. The use of such a card in no way precludes ad-hoc investigations of local choice. It would allow of valuable comparisons between universities and furnish material for the establishment of useful standards.

CLASSIFIED FINDINGS IN 155 STUDENTS

Condition	No. of male students	No. of female students	Total
Eye:			
Myopia	27	24	51 (33%)
Astigmatism	10	10	20 (13%)
Hypermetropia	3	5	8 (5%)
Strabismus	3	3	6 (4%)
Other eye conditions	2	4	6 (4%)
No. of students	43	42	..
Skin	25	24	49 (32%)
Spinal (scoliosis, kyphosis, lordosis)	21	22	43 (28%)
Surgical	22	14	36 (23%)
Ear, nose, and throat	14	9	23 (15%)
Gastro-intestinal	10	9	19 (12%)
Minor anxieties	9	11	20 (13%)
Systolic murmur	6	6	12 (8%)
Condition requiring general advice	2	6	8 (5%)
Sundry other medical conditions	18	20	38 (24%)
Dysmenorrhœa:			
Mild	..	16	16 (21%)
Moderate	..	6	6 (8%)
Chilblains	5	9	14 (9%)
Dental condition requiring treatment	6	7	13 (9%)
No. of abnormalities	183	205	388
No. of students	77	78	155
Average number of abnormalities per student	2·4	2·6	2·5

LIMITATIONS OF THE METHOD OF ROUTINE HEALTH EXAMINATION

Time is the most important factor. One hour was devoted to the interview and examination, including hæmoglobin estimation; of this it is as well to keep 10 minutes at the end for discussion of the findings and those important last-minute questions which a patient asks when his confidence is fully established. Chest radiograms are taken for convenience on a separate occasion. If taken beforehand and reported as normal they serve as a useful method of opening the interview. A maximum of 20 patients a week can be seen as a regular procedure, and the number of 1-hour examinations in a year is limited to a maximum of 450 where there are three 8-week terms. This means that if 1 hour were to be devoted to each annual re-examination, and the average stay at the university is 3 years, the annual entry which could be handled by one physician would be about 150. Where university terms are longer than 8 weeks, up to 250 might be a reasonable annual quota.

Now, if it is desired that the doctor supervise more than this number, a point will be reached at which this type of health examination, which is more suitable for research purposes, should go by the board and be replaced by another less time-consuming. One suggestion is that the more important headings could be extracted and embodied in a shortened form suitable for a half-hour interview. It is reasonable to suggest that most of the more important abnormalities would have been detected at a half-hour interview, provided that concentration was kept on their discovery. A number of headings such as addresses, schools, and experience in the Forces may be completed by a secretary-receptionist. Much time is saved if the student is provided with headings of previous history to complete at leisure beforehand, and this too often serves to crystallise in his mind some problem on which he wants advice.

What criticism may be offered of this briefer type of interview? It would hurry the proceedings and make the discovery of an abnormality prejudice the time-table. Thus it would not permit to the same degree the patient, accurate, and complete recording of data without which analysis and correlation would be valueless, though there should be no difficulty in recording such essential measurements as height and weight. With regard to the number of patients who could be seen, it certainly would not double this, though it would allow some

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increase. Despite these criticisms, if the half-hour consultation leads to the removal of the defects which can be remedied it will have served its main purpose.

If it is impossible to devote half an hour to each student, it might be better to limit the health service to routine chest radiography and facilities for consultation for those who complain or have some special problem they wish to discuss.

An alternative method for dealing with large numbers might be the setting up of a university medical board with an ophthalmologist and aural and dental surgeons in attendance. This immediately raises problems of expense, accommodation, and administration, together with the risk of some loss in the personal relationship between physician and student. Medical work in these circumstances for a long period is also apt to lose its hold over the doctor's interest.

As a last note, it should be emphasised that the life blood of routine health examination, especially when practised as a whole-time job, flows only so long as the channels of interest in the individual are open; should these be choked by an undue burden of routine, the value of health examinations must quickly decline. Where, on the other hand, time is available for interest to develop in the individual student, it grows greatly and the work as a whole seems more than worth while.

My thanks are due to Sir Henry Tizard, late president of Magdalen College, and to Dr. Janet Vaughan, principal of Somerville College, who helped to make this pilot survey possible. I am particularly grateful to Prof. J. A. Ryle for the benefit of his direction and criticism.

FAMILIAL IDIOPATHIC METHÆMOGLOBINÆMIA

FIVE CASES IN ONE FAMILY

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VERY few instances of idiopathic methæmoglobinæmia occurring as a familial disease have so far been reported. Deeny et al. (1943) described the condition in two brothers and found that the disease could be successfully treated with large doses of ascorbic acid, as had been found independently by Lian et al. (1939). Barcroft et al. (1945) made a detailed study of Deeny's cases during treatment and reviewed the literature of the disease up to 1940. Since then there have been reports of isolated cases treated successfully with ascorbic acid (King et al. 1944) and with methylene-blue and ascorbic acid (Sievers and Ryon 1945).

The cases reported here come from a family of nine brothers and sisters, five of whom are affected, a number larger than has been definitely authenticated in any family previously described. The effects of treatment are recorded, together with the results of biochemical investigations which throw light on the underlying metabolic abnormality responsible for the condition. The observations on this family may also provide material for genetic studies.

The family is set out in fig. 1. No. 6 came under observation first when he attended the outpatient department of a general hospital for a minor injury. He was referred to us because of his cyanosis, and we found that his blood contained a considerable amount of methæmoglobin. He was treated with ascorbic acid 300 mg. daily. The changes in his blood-methæmoglobin level during treatment are shown in fig. 2. He did not appear to be greatly concerned about his unusual colour and did not continue treatment. When we saw him four years later he had relapsed completely, having taken no ascorbic acid for at least eight months. We could not secure any satisfactory family history from him and at the time regarded him as an isolated case.

In 1946 his identical twin brother, no. 7, attended hospital for an injury to his hand and was similarly referred to us because of his cyanosis. We found methæmoglobin in his blood, and he told us that several other members of his family were abnormal in colour. They were so little concerned about their appearance that we could not persuade them to come to hospital for investigation and treatment.

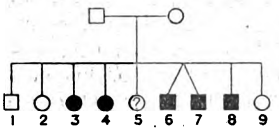

Fig. 1 — Familial idiopathic methæmoglobinæmia: affected males shown by black squares; affected females by black circles; nos. of members of the family correspond to those in the table.

We were anxious, in view of the rarity of the disease, to obtain all the information we could about the whole family. We therefore decided to visit them. They lived on a small farm in a remote and mountainous part of Ireland; and, since it is necessary in measuring methæmoglobin to carry out the determinations as soon as possible after taking the blood samples, we set out in a car fitted up as a mobile laboratory. The equipment included a Spekker photo-electric absorptiometer and a Beck-Hartridge reversion spectroscope, both modified to work from the car accumulator. The family were most coöperative, and we obtained blood samples from all the living members of the family except one whom we could not reach.

ANALYSIS OF BLOOD PIGMENTS

Venous samples were taken from the arm and put into tubes containing potassium and ammonium oxalate mixture. They were kept ice-cold until analysed for methæmoglobin about two hours later. The blood samples were examined in the reversion spectroscope. Those from the cyanosed members of the family all showed an absorption band in the red, the mid-point of the band being at 633–634 mμ indicating the presence of methæmoglobin. The band was clearly visible in a dilution of 1 in 40 when viewed in a thickness of 2 cm.

Methæmoglobin was determined photo-electrically by a method based on that of Evelyn and Malloy (1938), which depends on the increase in transmission of red light when methæmoglobin is removed by addition of cyanide. Blood 0·6 ml. is added to 16 ml. of distilled water; and, after it has stood for 10 min., 8 ml. of *M*/10 phosphate buffer (pH 6·9) is added. It is preferable to centrifuge the mixture strongly for 20 min. at this stage. We have found it a great advantage, when measuring small amounts of methæmoglobin, to use a differential method of reading in the absorptiometer. The solution is put into two similar 1-cm. glass cells, which are read one against the other. The cyanide is then added to one and the reading repeated. From the change in absorption, the methæmoglobin is found from a calibration curve prepared in the same way from blood containing various known amounts of methæmoglobin.

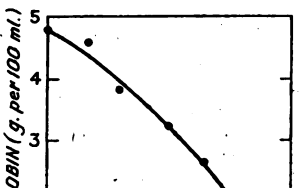

Fig. 2 — Changes in blood-methæmoglobin level in no. 6 during treatment with ascorbic acid 300 mg. a day.

Total blood pigments were determined by the alkaline-hæmatin method using the artificial standard of Gibson and Harrison (1945).

The accompanying table shows the blood-methæmoglobin levels of all members of the family except no. 1, who was away from home but was stated independently by three members of his family to be normal and never

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to have been blue. His present employer confirmed that he is free from any signs of cyanosis.

The mother had died some years previously, aged 48, but was stated never to have been cyanosed. We also visited her brother, who showed no cyanosis. One of her daughters stated that her mother had been very fat and had died of a "liver complaint," having been jaundiced for seven months before her death; there was no evidence to suggest that her blood had ever contained any abnormal amount of methæmoglobin.

The father's blood was also perfectly normal, as was that of three of his children, the finding of 0·1 g. of methæmoglobin per 100 ml. in the blood of no. 9 being within normal limits (Gibson and Harrison 1945).

The remaining five brothers and sisters all showed methæmoglobin in their blood in abnormal amounts in accord with their abnormal appearance. None of them seemed to suffer any appreciable physical disability from the presence of the abnormal pigment, but they all said they "felt better" as a result of treatment.

As regards age of onset of the cyanosis, no satisfactory history was obtained from any of the people affected, who seemed very uncertain about how long they had been blue. The general consensus of opinion suggested that the cyanosis had first appeared in adolescence. None of them is married. It was stated that no other relations of the family had ever shown any cyanosis.

The father said that both his own and his wife's family had lived in the village for generations, and that he was related to his wife—"fourth cousins or something of the sort."

FINDINGS IN FAMILY AFFECTED BY IDIOPATHIC METHÆMOGLOBINÆMIA

No.	Age (years)	Colour of skin	Initial met-Hb (g./100 ml.)	Total pigments (g./100 ml.)	Met-Hb as % of total pigments	Met-Hb after treatment (g./100 ml.)
Father	67	Normal	0·0	14·6	0	..
1	32	,,	..	..	..	..
2	31	,,	0·0	15·6	0	..
3	28	Lavender	3·1	15·3	20	0·1
4	27	Grey-blue	1·9	15·9	12	0·3
5*	..	..	..	..	..	..
6	22	Slaty-blue	4·8	18·7	26	1·3
7	22	,,	5·1	18·8	27	0·5
8	21	Grey-blue	1·9	17·4	11	0·1
9	18	Normal	0·1	12·7	1	..

* Died of pertussis at 7 months.

This evidence, together with such other information as is available in the literature (see Barcroft et al. 1945), makes it very probable that this form of methæmoglobinæmia is inherited as a recessive character. The proportion of sibs affected in the present family is much higher than would be predicted on average for a recessive factor, but wide departures from the theoretical proportion would be expected in individual families.

TREATMENT

No. 6 received ascorbic acid only, 300 mg. a day by mouth, with the result shown in fig. 2. No. 7 received ascorbic acid 1 g. daily for two days followed by intravenous methylene-blue 75 mg. This was followed by rapid improvement, a blood sample taken $1^1/_2$ hours later showing only 0·5 g. of methæmoglobin per 100 ml. Nos. 3, 4, and 8 received ascorbic acid 1 g. and methylene-blue 300 mg. by mouth in capsules. (The samples for the final blood analysis of nos. 3, 4, and 8 given in the table were taken 24 hours after the administration of the methylene-blue.) The ascorbic-acid intake was maintained at 1 g. a day for four days, and then reduced to 300 mg. a day. Methylene-blue by mouth appeared to be as effective as giving the dye by injection, and cleared the blood of methæmoglobin within a few hours. The rapid change to normal of the skin colour was very striking.

SHIFT IN OXYGEN-DISSOCIATION CURVE

Hitzenberger (1932) found that in familial idiopathic methæmoglobinæmia the oxygen-dissociation curve of the blood was shifted to the left—i.e., the blood gave up oxygen less readily than is normal at a given oxygen pressure. Darling and Roughton (1942) have shown that this shift occurs in hæmoglobin solutions containing methæmoglobin produced artificially both in vivo and in vitro. (We are grateful to Prof. H. Barcroft for calling our attention to these papers.) Darling and Roughton interpret the shift as being due to the presence, in a hæmoglobin-methæmoglobin mixture, of molecules containing both ferrous and ferric atoms in various atomic proportions.

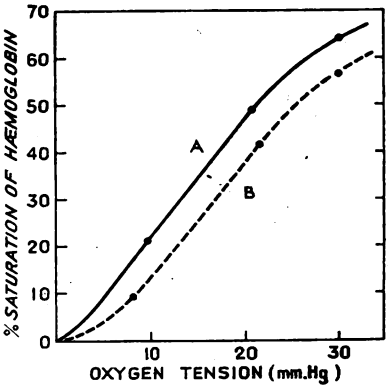

Fig. 3—Oxygen-dissociation curve of blood of no. 7: A, with blood containing 4·2 g. of methæmoglobin per 100 ml.; B, with blood after removal of methæmoglobin by methylene-blue.

We determined the oxygen-dissociation curve in the blood of no. 7 by equilibrating the blood at 37°C with suitable mixtures of oxygen and nitrogen containing carbon dioxide at a pressure of 40 mm. Hg. Samples of the blood and of the gas mixtures were then withdrawn and analysed respectively in the Van Slyke-Neill apparatus and Haldane apparatus.

The shift in the dissociation curve was demonstrated in two ways:

(1) The dissociation curve of no. 7 was determined on the blood in the presence and absence of methæmoglobin. For this purpose a large sample of his blood was defibrinated by stirring with glass-wool and divided into two portions.

The methæmoglobin was removed from one portion by incubating at 37°C for an hour in the presence of 0·01 *M* glucose and 0·00005 *M* methylene-blue. (Control experiments showed that methylene-blue does not influence the dissociation curve of normal blood.) The same volume of glucose was added to the other portion but no methylene-blue.

The dissociation curves of both portions were then determined, with the results shown in fig. 3: the removal of the methæmoglobin produced a shift to the right in the position of the curve.

(2) The dissociation curve of the blood from no. 7 was compared directly with the oxygen-dissociation curve of a sample of normal blood. The results confirmed those obtained by removing methæmoglobin with methylene-blue, the curve for blood containing methæmoglobin being shifted to the left as compared with that of normal blood.

The shift in the dissociation curve and its change in shape from the S-shape characteristic of normal blood towards a hyperbolic form is of importance, since it would tend to make oxygen less readily available to the tissues. Thus, as Darling and Roughton (1942) point out, the substitution of the normal pigment by methæmoglobin would be expected to produce more severe effects than would a simple loss of the same amount of hæmoglobin.

DISCUSSION

The shift in the dissociation curve has a possible bearing on the interpretation of the mode of production of the abnormal pigments. One mechanism which might be postulated is that there is a defect in the bone-marrow leading to a production, by a part of it, of corpuscles containing only methæmoglobin, and that the proportion of abnormal bone-marrow determines the amount

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of methæmoglobin in the blood. There would then be two kinds of corpuscles in the circulation, one containing normal (ferrous) hæmoglobin molecules, and one containing 100% methæmoglobin (ferric). In these circumstances there would be no opportunity for the two types of pigment to interact, and the oxygen-dissociation curve would be expected to be normal in position. In fact, however, as shown in fig. 3, the curve is shifted away from normal to the left. This hypothesis of the production of two types of corpuscle is thus evidently wrong. It seems much more likely that in idiopathic methæmoglobinæmia the abnormal pigment is distributed evenly throughout the red cells of the body rather than segregated in individual cells. According to the theory of Darling and Roughton (1942), there will then be an exchange of electrons between ferrous and ferric atoms, leading to pigment molecules each containing both ferrous and ferric atoms. Such molecules, they believe, have a stronger affinity for oxygen than has ordinary ferrous hæmoglobin. The shift in the curve in our experiments would thus be explained.

We believe that the abnormal amount of methæmoglobin is not due to any bone-marrow defect but to a disturbance in the equilibrium hæmoglobin⇄methæmoglobin (including any intermediate compounds) which in normal blood is very far to the left. Work shortly to be published (Gibson) has led to the conclusion that the reduction of methæmoglobin in normal persons depends on the triose phosphoric and lactic enzymes of the erythrocytes. These enzymes function with cozymase and coenzyme factor I in bringing about methæmoglobin reduction. Examination of the erythrocytes taken from cases of idiopathic methæmoglobinæmia has shown that they are deficient in coenzyme factor I. The accumulation of large amounts of methæmoglobin in the blood is thought to be due to the inability of the enzyme systems to reduce it to hæmoglobin. As it is probable (Peters and Van Slyke 1931) that methæmoglobin is constantly being formed in the blood of normal persons, we may suppose that the equilibrium level of methæmoglobin will depend on the efficiency of the enzymes which remove it. When these enzyme systems are deficient, large amounts of methæmoglobin will be present in the blood.

The rapid removal of methæmoglobin from the blood after the administration of methylene-blue is probably due to the catalytic action of the dye, which causes methæmoglobin to be reduced by enzymes which are otherwise unable to bring about this reaction (Gibson unpublished). The action of ascorbic acid in altering the blood-methæmoglobin level seems to be due to a direct reaction between methæmoglobin and ascorbic acid (Gibson 1943). The reaction is comparatively slow. Even with the greatest concentration of ascorbic acid which it is possible to attain in the blood, the displacement of the equilibrium methæmoglobin ⇄ hæmoglobin in favour of hæmoglobin is not sufficiently great to lead to the complete disappearance of methæmoglobin from the blood. It has been found in practice that these cases of methæmoglobinæmia when treated with ascorbic acid tend to settle down at a level of about 1 g. of methæmoglobin per 100 ml. As indicated by the work of Sievers and Ryon (1945), this equilibrium value of blood methæmoglobin is similarly approached from the other side with ascorbic acid treatment after methylene-blue has been given.

As regards the treatment to be recommended, it has been shown by several workers (see Barcroft et al. 1945, King et al. 1944, Sievers and Ryon 1945) that the blood methæmoglobin of these patients can be kept at this low level with daily doses of ascorbic acid of about 0·3–0·4 g., and that under these conditions hardly any cyanosis can be detected. On the other hand, the action of a single dose of methylene-blue, even when taken by mouth, is much more rapid and complete, as shown in the table, but its action is only transitory. It seems preferable to recommend continuous treatment with ascorbic acid, a natural food constituent, rather than with methylene-blue, which might possibly have an unsuspected toxic action after prolonged dosage. We feel, however, that it may be desirable to supplement the action of ascorbic acid with an occasional dose of 0·3 g. of methylene-blue by mouth, particularly if, as the result of temporary failure to keep up the intake of ascorbic acid, the cyanosis shows signs of returning.

SUMMARY

Five cases of familial idiopathic methæmoglobinæmia in one family of nine brothers and sisters are described.

Treatment with methylene-blue and ascorbic acid by mouth was successful.

The oxygen-dissociation curve of blood from one of these patients showed a shift to the left.

The ætiology of the disease and the significance of the findings are discussed.

We wish to thank Dr. P. J. Courtney, whose coöperation did much to make the investigation possible, and Dr. S. I. Turkington, who generously placed the facilities of his ward at our disposal.

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RH FACTOR AND HÆMOLYTIC DISEASE OF THE NEWBORN IN JERUSALEM JEWS

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EVER since the discovery of the rôle played by the Rh factor in the pathogenesis of erythroblastosis fœtalis (Levine and Katzin 1940) it has been apparent that a correlation exists between the frequency of hæmolytic disease of the newborn and the distribution of the Rh antigen in the population. The incidence of Rh-negative persons is about 15% in the white races as compared with 0·6–4·5% in the coloured races (table I). There seems to be little doubt that in races with a small ratio of Rh-negative persons, such as Indians (Ranganathan et al. 1946) and Chinese (Levine and Wong 1943), erythroblastosis fœtalis is rare or altogether absent.

Little has been published on the incidence of the Rh factor in Jews, though Lubinski et al. (1945) found 8·57% of Rh-negative persons in Jewish women in Canada. In a previous study Gurevitch (1945) reported an incidence of 15% Rh-negative in a group of 400 blood examinations in Jewish persons in Palestine. It must be emphasised that his material was carefully selected, comprising cases of hæmolytic disease of the newborn and related conditions from the whole of Palestine. In fact, out of this limited material, 15 cases of Rh incompatibility, with anti-Rh antibodies in 8 of them, were found.

The fact that erythroblastosis fœtalis is rare among Palestinian Jews led us to expect a low incidence of Rh-negative persons among them. The fact that the

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TABLE I—RH FINDINGS IN DIFFERENT RACES

Author	Race	No. of cases	Rh-positive	Rh-negative
Traut et al. (1945)	White	7620	6485 (85·1%)	1135 (14·9%)
Levine (1942) ..	Negro	264	252 (95·5%)	12 (4·5%)
Rangánathan et al. (1946)	Hindus	145	139 (95·9%)	6 (4·1%)
Landsteiner and Wiener (1941)	American Indians	120	119 (99·2%)	1 (0·8%)
Levine and Wong (1943)	Chinese	150	149 (99·3%)	1 (0·7%)
Miller and Taguchi (1945)	Japanese	180	.. 99·4%	.. 0·6%
Lubinski et al. (1945)	Jews	967	886 (91·6%)	81 (8·4%)
Gurevitch et al. (present series)	Jews (Jerusalem)	1913	1730 (90·4%)	183 (9·6%)

Jewish community in Jerusalem is composed of groups of different origin adds to the interest of this study.

INVESTIGATION AND RESULTS

The material included in the present investigation consists of 940 women attending the prenatal clinics of the Hadassah Medical Organisation, 372 women delivered in the obstetrical department of the Hadassah University Hospital, 214 cases taken at random from among hospital patients and personnel, and 387 women whose obstetric history suggested Rh incompatibility. The results of the investigation showed that 9·6% were Rh-negative. These figures are compared in table I with those found in other racial groups.

To determine the distribution of the Rh antigen among the various Jewish communal groups studied, we have divided our material according to the origin of the patients: (1) Ashkenazim, of European origin; (2) Sephardim, from Mediterranean countries (Egypt, Tunis, Morocco, Greece, Bulgaria, &c.); (3) Yemenites, originating from the Yemen; (4) Kurds and Persians, originating from Northern Iraq and Persia; and (5) combined minor groups of oriental origin (Georgians, Babylonians, Assyrians, and others). The results of these studies are summarised in table II.

From table II it is evident that two groups stand out as having a very small proportion of Rh-negative persons among them—the Yemenite and the Kurdistani-Persian Jews. These groups contrast with the other communal groups, which have a ratio of Rh-negative persons nearer to that found in the white continental races, and it is perhaps significant that these two groups are noted for their segregated way of life, and intermarriage is very rare among them. Their very low proportion of Rh-negative persons is associated with an apparent absence of erythroblastosis fœtalis—out of 310 deliveries of Yemenite Jewesses and 1739 deliveries of Kurdistani-Persian Jewesses in the obstetrical department of this hospital during the last six years there has not been one case of erythroblastosis fœtalis.

TABLE II—RH FINDINGS IN DIFFERENT GROUPS OF JEWS

Group	No. of cases	Rh-positive	Rh-negative
Ashkenazim	1035	921 (89·0%)	114 (11·0%)
Sephardim	262	231 (88·2%)	31 (11·8%)
Yemenites	44	43 (97·7%)	1 (2·3%)
Kurds and Persians ..	203	200 (98·5%)	3 (1·5%)
Combined minor groups ..	369	335 (90·8%)	34 (9·2%)

It should be pointed out that our material comprises two clinically distinct groups: the one taken at random—i.e., not selected—and the other selected because the obstetric history suggested Rh incompatibility. The suggestive obstetric history was one in which, after one or more normal deliveries, there were stillbirths, premature deliveries, abortions, &c. Table III shows that the incidence of Rh-negative persons in these two clinically distinct groups among the Ashkenazi Jews was practically the same. This seems to indicate that the incidence of Rh-negative persons plays no important rôle in the general obstetric pathology (stillbirth, abortion, antenatal death, &c.), but it does not lessen the importance of Rh antigen as a decisive factor in hæmolytic disease of the newborn.

DISCUSSION

As pointed out above, hæmolytic disease of the newborn is relatively rare in Palestine. Out of 12,645 deliveries in the obstetrical department of the Rothschild Hadassah University Hospital, there have been 5 cases of erythroblastosis fœtalis and 1 case of congenital anæmia during the past eight years. If we are to assume, on the basis of our findings in 2000 cases, that the ratio of Rh-negative persons in our obstetrical material is about 10%, it means that the total number of Rh-negative women delivered in our department was about 1264. It follows that only 1 of every 210 Rh-negative women has given birth to a child with hæmolytic disease of the newborn.

TABLE III—RH FINDINGS IN ASHKENAZI JEWS

Group	No. of cases	Rh-positive	Rh-negative
Selected ..	483	429 (88·8%)	54 (11·2%)
Not selected ..	552	492 (89·1%)	60 (10·9%)

It has already been observed that the ratio of hæmolytic disease of the newborn to Rh-negative mothers is about 1 : 50 (Wiener 1945). Wiener (1946) has suggested that this is due to a constitutional factor, which he has designated "K" and which confers the ability to produce antibodies in response to an incompatible antigen. If Wiener's view is correct, it seems that, besides a relatively low incidence of Rh-negative persons among our material, there is also a reduced incidence of the constitutional factor K.

SUMMARY

Among 1913 Jews of different origin the incidence of Rh-negative persons was found to be 9·6%.

These included 203 Kurdistani-Persian Jews and 44 Yemenite Jews, in whom the incidence of Rh-negative persons was 1·5% and 2·3%.

Among 12,645 deliveries in eight years there were only 6 cases of hæmolytic disease of the newborn, an incidence of 1 in 210 deliveries. Among 2049 deliveries in Kurdistani-Persian and Yemenite Jewesses in six years there was not a single example of hæmolytic disease of the newborn.

The relation between the low incidence of Rh-negative persons and the rarity of hæmolytic disease of the newborn among them is discussed.

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MEMBRANOUS NATURE OF INTERSTITIAL CONNECTIVE TISSUE

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A PECULIARITY of interstitial connective tissue which has puzzled histologists for many years is the lack of correlation between its naked-eye and microscopical appearances.

To the naked eye this tissue appears in the form of membranes of various thicknesses. These membranes present considerable obstruction to the spread in the tissues of effusions of blood, inflammatory exudates, and malignant tumours and may therefore be considered to be relatively impermeable to particles of the size of red blood corpuscles. In contrast the microscopical picture of connective tissue, whether derived from stained sections or from the examination of fresh tissue, in no way suggests a membranous structure; connective tissue appears to be composed of a network of fibres with occasional spindle-shaped or stellate cells, the meshes of the net being considerably larger than the particles to which connective tissue is so obviously impermeable.

It was suggested by Flemming [1] that connective tissue is not composed merely of cells and fibres but that these structures are combined into membranes by some sort of cementing substance. More recently Laguesse [2] claimed that he had demonstrated an essentially lamellar arrangement in connective tissue. The observations described here tend to confirm this conception of the structure of connective tissue and thus to bring its microscopical into conformity with its naked-eye appearance.

From a recently killed rat, a thin lamella of connective tissue was excised, moistened with neutral distilled water, and spread out on a glass slide. The corners were drawn out with filter paper until they became dry and adherent, whereupon they were firmly fixed with a drop of melted paraffin wax; meanwhile the main part of the preparation was kept moist. When the corners had become firmly anchored, the preparation was treated with dilute acid at a pH of 3·6, after which a coverslip was applied, and the edges of it were sealed to the slide with paraffin wax.

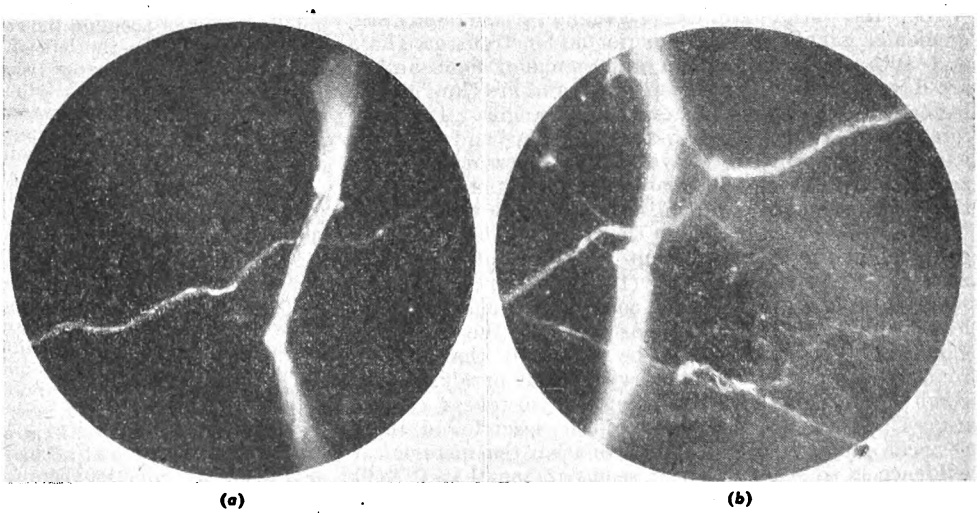
When the thinnest parts of such a preparation were examined microscopically with dark-ground illumination, the spaces between the brilliantly refractile collagen bundles were filled by a moderately dense opacity. Careful examination of this opacity with the highest magnification revealed that it was composed partly of a faint amorphous haze, partly of refractile granules, and partly of exceedingly fine angularly branching fibrils. The smallest collagen and elastic fibrils were embedded in the general opacity like twigs on the surface of a frozen pond. It must be emphasised that even when these structures were freely suspended in the mounting fluid, and not attached to either the slide or the coverslip, they lay in the same optical plane. With the slightest alteration in focus they all disappeared together. A similar effect was produced when the coverslip was gently pressed. The impression given was that of an extremely thin and tautly stretched membrane. In places the tension of the membrane had altered the alignment of the collagen bundles to which it was attached. Elsewhere, where the membrane had become unduly stretched, it had broken up into a system of branching fibrils with attached granules (see figure), the intervening opaque haze having disappeared. Networks formed in this way still tended to lie in one plane and looked like a cobweb. In places where the tension had been even greater the networks broke down into separate fibrils which no longer lay in the optical plane of the remainder and, when the coverslip was pressed, could be made to move independently.

Similar delicate membranes and cobweb-like networks were also observed in preparations treated for several hours in 50–60% ethyl alcohol at neutrality. However produced they seemed to be permanent structures. They did not disappear when the tissue was again mounted in neutral distilled water, nor even after prolonged treatment with 0·001*N* NaOH; but they disintegrated rapidly in the presence of trypsin.

The range of pH in which the membranes and cobweb-like fibrils were formed was precise. Between pH 3·6 and 3·9 they formed within a few minutes; at pH 4·2 their formation was much slower and incomplete; and at pH 4·6 they did not appear at all.

After fixation these preparations gave negative reactions for fibrin both when stained by phosphotungstic acid hæmatoxylin and by Weigert's method. The appearance of the cobweb fibrils on dark-ground illumination also differed entirely, both in delicacy and mode of arrangement, from that of fibrin.

The irreversible formation of these membrane-like structures within a narrow range of pH strongly suggests that the phenomenon is due to the precipitation of a protein at its iso-electric point; moreover the facility with which the membranes were disintegrated by trypsin seems to indicate that protein plays an essential part in their composition.



(*a*) (*b*)

Dark-ground picture of a piece of rat fascia mounted in distilled water: (*a*) at pH 7·0, showing two collagen bundles; (*b*) same field after treatment for several minutes at a pH of 3·7. Cobweb-like fibrils have appeared. They have been formed in a tautly stretched membrane of extreme thinness and therefore lie in the same optical plane. (× 600.)

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GLOSSOPHARYNGEAL ZOSTER
FOLLOWED BY VARICELLA IN TWO CONTACTS

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A CASE of zoster in the distribution of the glossopharyngeal nerve is reported here. Wilson (1940) reports a similar case and states that very little seems to be known of zoster in this distribution. Hunt (1910), however, cites a case reported by Chauveau in 1901 in which the vesicles were limited to the zone supplied by this nerve, and he lists, under the heading "herpes pharyngis," eighteen published cases of which at least five appear to refer to zoster, one (Lermoyez and Barozzi 1897) being bilateral. All of these cases may not have been glossopharyngeal in origin, for ipsilateral vesicles on the hard and soft palates may appear in geniculate zoster, owing, it is thought, to involvement of the greater superficial petrosal nerve (Wakeley and Mulvany 1939). The only reference I can find in the *Quarterly Cumulative Index Medicus* since 1920 to glossopharyngeal zoster, unassociated with facial paralysis, is a case reported by Gounelle and Warter (1934). Glossopharyngeal zoster in combination with geniculate zoster, characterised by facial paralysis besides the vesicular eruption, is described by Hunt (1910), McKenzie (1915, quoted by O'Neill 1945), Neve (1919), Dennis (1925, quoted by Watson 1941), Jacques (1931), Nattkemper (1932), Rabbiner (1938), Baldenweck and Degorce (1939), Watson (1941), and Negus and Crabtree (1943).

When the vagus nerve is involved, besides laryngeal vesicles, persistent nausea and vomiting are conspicuous features; in Watson's (1941) case they persisted five weeks. These symptoms were also prominent and persistent in the present case, but there were no laryngeal symptoms.

The ganglia connected with the following cranial nerves —viz., the 5th (semilunar ganglion), 7th, and 8th (genicular ganglion), 9th (superior and petrous ganglia), and 10th (jugular ganglion and ganglion nodosum)— are developed from the neural crest and are thus homologous with the spinal posterior root ganglia. It therefore seems probable that the superior and petrous ganglia are primarily involved in glossopharyngeal zoster, and in the present case the jugular ganglion and the ganglion nodosum may also have been involved.

Doubt has been cast on the rôle of the genicular ganglion in the Ramsay Hunt syndrome of geniculate zoster. Denny-Brown et al. (1944) have reviewed the scanty histological reports and contend that characteristic lesions have not been demonstrated in the genicular ganglion. Though it must be admitted that lesions round the ear in conjunction with facial paralysis may result from various combinations of zoster of cranial nerves and from involvement of the second and third cervical ganglia (zoster occipitocollaris), the histological evidence is so scanty that it seems to me that O'Neill (1945) tends unnecessarily to belittle the probable rôle of the genicular ganglion. Nevertheless, since zoster may spread beyond the confines of the ganglia and sensory neurones and involve spinal motor tracts (Taterka and O'Sullivan 1943) and may even cause encephalitis (Schiff and Brain 1930), and since aberrant vesicles and generalised vesicular rashes may develop, it is impossible to demarcate with certainty the sensory zone or motor connexions of a single ganglion from a solitary attack of zoster.

The eruption in glossopharyngeal zoster is seen as an ipsilateral involvement of the pharynx, tonsillar fossa, faucial pillars, and soft palate. Hunt (1910) considered that the posterior portion of the tympanum might also be involved, and this was described by Chauveau in 1901. I did not investigate this point carefully, but the lack of pain in the ear, after the eruption developed, suggests that the tympanum was not affected, and Wilson (1940) and Neve (1919) state that the tympanum was unaffected in their cases.

CASE-RECORD

A British male post-office official in Kenya, aged 47, had had varicella, with his sisters, at the age of 10 years.

The only other features of note in his previous history were recurrent troubles with the left parotid gland from 1933, culminating, in November, 1944, in the drainage, through the parotid duct, of a cystocele of the left parotid gland.

On Dec. 14, 1945, he began to have pain in the throat and, to a less extent, in the right ear for five days. During the first four days he continued at work.

On the sixth day I was called to visit him and found the temperature 100°F. There was a little cerumen in the right external auditory meatus and, so far as could be seen, only slight congestion of the tympanum.

In the pharynx there were several ovoid ulcers, about 0·8 cm. × 0·2 cm., on the posterior pharyngeal wall to the right of the midline.

A direct smear from a throat swab did not reveal any pathogens, and on culture only *Neisseria catarrhalis* and pneumococci were grown. Patient was given benzylsulphanilamide ('Proseptasine') 1 g. four-hourly. Next day the condition was unchanged, and another throat swab gave identical results.

Next day (Dec. 21), the throat being still more painful and the patient vomiting, he was admitted to the European Hospital, Nairobi, under my care. Temperature 100°F, pulse-rate 88. Besides the ulcers on the posterior pharyngeal wall, there was now a cluster of superficial ulcers of various shapes on the right half of the soft palate, each ulcer being surrounded by a linear erythematous zone.

These ulcers were arranged in groups, the most anterior reaching nearly to the junction between the soft and hard palates. Except one rather large oval ulcer, whose long axis was exactly in the midline of the posterior pharyngeal wall, all the ulcers were situated to the right of the midline and were scattered on the posterior pharyngeal wall, right tonsillar fossa, faucial pillars, and soft palate.

Next day other spots were noted: one on the nose in the midline, most of them on the right side of the chest and right arm, but a few to the left of the midline. One of these I saw in the vesicular stage; the others had already formed superficial raw areas.

The ulcers in the throat were extremely painful, and nausea persisted. Taste was not tested. The right ear had ceased to be painful, and the tympanum was not re-examined.

No lesions were seen on the protruded tongue, but patient said the back of the tongue felt sore but that the remainder of the tongue felt normal and appreciated taste normally. There were no lesions on the hard palate, buccal mucosa, or right pinna.

The preceding pain, the pyrexia, and the character and distribution of the lesions led me to diagnose glossopharyngeal zoster with some scattered aberrant lesions on the trunk, nose, and limbs. The remaining cranial nerves (with the probable exception of the vagus) were unaffected; no motor changes or other physical abnormalities were detected. The larynx was not examined.

Temperature was 100°F at night on the 21st and 22nd, 99·2°F on the 23rd, and normal on the mornings of the 23rd and 24th. On the 21st there were 9100 leucocytes per c.mm. (neutrophils 77%, lymphocytes 20%, mononuclears 3%).

After patient's admission to hospital no more sulphonamides were administered, but he was given aspirin gargles, nicotinic acid, and phenobarbitone, and the ulcers were swabbed with 1% cocaine, without much relief being obtained. I regret that I did not administer pituitrin.

On the 24th patient felt somewhat improved and went home for Christmas. Nausea and frequent vomiting persisted.

I re-examined him on the 29th and found the pharynx practically normal, only a few injected spots being discernible. The bowels were open normally, but nausea and vomiting continued. These symptoms suggested involvement of the right vagus nerve. Radiography after a barium meal on Jan. 7, 1946, gave no evidence of an organic lesion in the stomach or duodenum.

Nausea, with occasional vomiting, persisted a further ten days, since when patient has been in normal health,

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except that three months later he still experiences some discomfort in the right side of the pharynx.

Varicella in Contacts.—On Jan. 2, 1946, patient's daughter, aged 13 years, and two days later her brother, aged 4 years, exhibited typical varicella rashes.

The development of varicella by the patient's two children living at home, 14 and 16 days after the father's eruption, strongly supports the diagnosis of zoster. The case is therefore presented as one of zoster of the right glossopharyngeal nerve with probable involvement of the right vagus nerve.

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Preliminary Communication

DETECTION OF LATENT GENITAL TUBERCULOSIS BY CULTURE OF MENSTRUAL DISCHARGE

LATENT female genital tuberculosis is commoner than has been hitherto suspected, as shown by endometrial biopsies in cases of primary sterility in women without any clinical symptoms pointing to either general or genital tuberculosis.

Berblinger [1] found only 7·8% of genital tuberculosis in 320 necropsies on women who died of pulmonary tuberculosis.

Lackner et al.[2] found the same percentage in necropsies on tuberculous women. The fact, however, that they found tuberculous endometritis in only 1·6% of 125 women with active pulmonary tuberculosis who were submitted to endometrial biopsy is very significant.

This is in contrast with the results obtained by Schockaert and Ferin [3] in Belgium, Sutherland [4] in England, and Rabau et al.[5] in Palestine, who found tuberculous endometritis in an average of 5% of women with primary sterility.

A still higher incidence of tuberculous endometritis was found by me [6] in sterile women in whom salpingography showed a tubal occlusion.

Hitherto endometrial biopsy has been considered the most reliable criterion of genital tuberculosis in a woman; but it can give a positive result only when tuberculosis has already reached not merely the endometrium but also the particular portion of it removed for scrutiny. Further, the manipulation with instruments of women suspected of genital tuberculosis is not devoid of danger. In 5 of our patients with tuberculous endometritis curetting was followed by severe pelvic peritonitis.

Nor have the various specific and aspecific tests contributed much to the diagnosis of latent genital tuberculosis. The erythrocyte-sedimentation rate was normal in all cases of tuberculous endometritis. The intradermal tuberculin reaction (Mantoux) was in most cases positive; but this does not prove much in adults and certainly does not indicate the structures involved. For the same reason we have abstained from using the complement-fixation test.

Theoretical and practical considerations led us to try to isolate the *Mycobacterium tuberculosis* in the menstrual discharge by means of specific culture media.

1. Berblinger, W. *Schweiz. med. Wschr.* 1940, **76**, 1171.
2. Lackner, J. E., Schiller, W., Tulsky, A. S. *Amer. J. Obstet. Gynec.* 1940, **40**, 429.
3. Schockaert, J. A., Ferin, J. *Brux. méd.* 1940, **20**, 448.
4. Sutherland, A. M. *J. Obstet. Gynæc.* 1943, **50**, 161.
5. Rabau, E., Halbrecht, I., Casper, J. *J. Amer. med. Ass.* 1943, **122**, 801.
6. Halbrecht, I. *Lancet*, 1946, i, 235.

TECHNIQUE

The menstrual discharge is a mixture of blood, mucus, and parts of the endometrium. The blood is found in the vagina partly in a non-coagulated condition. We removed as much material as possible from the fornix and the os with a vaginal speculum and transferred it to a sterile test-tube containing 1 ml. of our anticoagulant solution, using Petragnani's specific culture medium. The women were told to report the first or second day of the menses. We consider it imperative to repeat the test at least thrice in the same patient, because often we obtained positive results only after one or two negative tests. Only positive tests are to be considered; negative results do not exclude genital tuberculosis.

MATERIAL AND RESULTS

The menstrual discharges of 80 women with primary sterility were examined. Among them were 10 women in whom endometrial tuberculosis had been found before this test, and in 2 others genital tuberculosis was clinically suspected. Of 140 tests made in these 80 women, in 9 cultures colonies of *M. tuberculosis* were found, whereas 19 others showed non-pathogenic acid-fast bacilli.* In 3 cases of cultures containing *M. tuberculosis* the results were confirmed by animal tests. By the same methods the menstrual blood of 30 healthy women who previously had given birth to at least one child was examined as a control, and in only 1 case did non-pathogenic acid-fast bacilli grow. The 9 positive cultures came from 6 women whose histories follow:

Case 1.—A woman of 34 with eight years' primary sterility. Five years ago we had found that she had tuberculous endometritis. Manual examination of genitalia negative. Mantoux positive. Radiography of lungs normal. For the last three years she had had tuberculosis of the kidneys.

Menstrual blood on culture gave *M. tuberculosis* in 4 tests made in 4 consecutive menses, whereas cultures from peripheral blood were negative. Animal tests were positive.

Case 2.—A woman of 28 with five years' sterile marriage. Result of endometrial biopsy suggested tuberculous endometritis. Bimanual examination of genitalia negative. Erythrocyte-sedimentation rate normal. Lungs normal.

Cultures of menstrual discharge gave negative results twice, but the third time gave *M. tuberculosis*. Animal tests positive.

Case 3.—A woman of 32. Bimanual examination revealed a tumour the size of an average apple in the region of the right adnexa, probably inflammatory in origin. Cultures gave at first a negative result; the second test, however, was positive.

Case 4.—A woman with three years' primary sterility. Endometrial biopsy showed no sign of tuberculosis. Cultures of menstrual discharge were positive for tubercle bacilli. Culture of peripheral blood negative.

Cases 5 and 6.—Two women with primary sterility of one or two years' duration. No genital or other tuberculosis suspected. Cultures of their menstrual discharges grew *M. tuberculosis*.

All the bacteriological tests were made in the central laboratories of the Kupath Cholim, Tel Aviv.

DISCUSSION

The possibility of cultivating *M. tuberculosis* from menstrual discharge on specific culture media is of great practical importance. It is not difficult to distinguish morphologically *M. tuberculosis* from non-pathogenic acid-fast bacilli. Even the macroscopical appearances

* Non-pathogenicity was determined by the cultural characteristics, and in 6 cases by guinea-pig inoculation.

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of the colonies are completely different. In doubtful cases, however, it is advisable to inoculate the material from the cultures into animals to test their pathogenicity.

In cases where genital tuberculosis is clinically suspected the culture of menstrual discharge is the only safe method of establishing the diagnosis. Further, it is advisable to examine menstrual discharge at least thrice in cases of primary sterility before engaging in intra-uterine intervention (insufflation, salpingography, endometrial biopsy).

The presence of *M. tuberculosis* in the menstrual blood is, in all probability, not due to a bacteræmia. In all those cases in which the peripheral blood was examined no *M. tuberculosis* were found, though the menstrual blood was positive.

It is not yet known how far these women are dangerous to their environment owing to the discharge of *M. tuberculosis* in the menstrual blood. Though the husbands of these women do not show any inoculation of tuberculosis on their genitalia, such women are advised to take precautions against the possibility of disseminating *M. tuberculosis* in their menstrual blood.

SUMMARY

The menstrual discharges of 80 women with primary sterility were examined by means of specific culture media for the presence of *M. tuberculosis*.

Out of 140 tests there were 9 positive findings in 6 patients.

In 19 cultures only non-pathogenic acid-fast bacilli grew.

I wish to thank Dr. E. L. Bregman, director of the laboratories, and his collaborators, Miss Miriam Perechodnik and Mr. N. Vigodsky, for their inestimable help; and Professor Klopstock for valuable suggestions, and providing facilities for the animal tests.

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Reviews of Books

Obstetrics and Gynæcology

A Revision Course for Practitioners. C. SCOTT RUSSELL, M.A., M.B., F.R.C.S.E., M.R.C.O.G., assistant director, department of obstetrics and gynæcology, University of Manchester. London: Oxford University Press. 1947. Pp. 211. 13*s.* 6*d.*

THIS is a book of truly remarkable brevity, which within its small compass manages to say a great deal, all of it orthodox and sound. It cannot, however, be regarded as more than a refresher. The subject of gynæcology is literally written off in under 50 pages, whereas X-ray pelvimetry in disproportion is given disproportionate prominence, considering that this is a luxury which the average practitioner must usually do without. It is hinted, however, that this book is for the doctor whose life in the Armed Forces has sheltered him, for a while, from the wrath of the P.P.H. to come; and its avowed purpose is to stimulate him to renew his acquaintance with the subject. Within these limitations it is admirable.

The Doctor and the Difficult Adult

WILLIAM MOODIE, M.D., F.R.C.P., D.P.M., physician, department of psychiatry, University College Hospital. London: Cassell. 1947. Pp. 296. 15*s.*

Dr. Moodie has exceptional knowledge of the "difficult" of all ages. Here he deals with those who have the years but not the discretion of the fully grown. As might be expected, his book is simply written, wise, and full of common sense.

The writer of a non-technical book dealing largely with the neuroses is, however, beset by a special difficulty: any simplified account of psychotherapy is apt to leave the reader asking "Is that all there is to it?" Even Dr. Moodie, with all his skill, tends to leave the impression that good will and common sense are not only necessary but also sufficient.

He may be said to belong to the English eclectic school. Eclectic, because he acknowledges no allegiance to any one predecessor; English, because of his empiricism, his freedom from general principles or a-priori concepts. English, too, in the convention that normality implies understatement—indeed, denial—of emotion, feeling, æsthetic sensibility, or intellectual probing. His philistine values sometimes shock in several ways at once:

> "The law in English-speaking countries still looks upon homosexual acts as illegal and punishable. . . . There can be no doubt that the law in England is right."
>
> "The usual religious teaching which means Bible study by children who cannot understand it and learning the Catechism by memory under the supervision of uninterested teachers . . . would usually be better left alone, and the same applies to sex teaching."

It is all the more impressive that he comes out as an uncompromising opponent of corporal punishment. And here he takes the trouble to present us with evidence, not prejudice.

The chapter on the approach to the difficult patient is particularly good, giving some of the details and fine points which are the harvest of psychiatric experience, and which form no part of the equipment of the well-intentioned but untrained.

Cancer: Diagnosis, Treatment and Prognosis

LAUREN V. ACKERMAN, M.D., pathologist to the Ellis Fischel State Cancer Hospital; JUAN A. DEL REGATO, M.D., radiotherapist to the hospital. London: H. Kimpton. 1947. Pp. 1115. £5.

THE authors have provided a satisfactory guide, though they have not altogether overcome the difficulty of giving an adequate outline of treatment without entering into detail. Special efforts are being made in the United States to ensure early diagnosis. Michael B. Shimkin summarises cancer research, the histological studies of the early oncologists, animal tumours, carcinogenesis, the rôle of heredity, and the effects of œstrogens and other hormones, rounding off with a section on cancer theories. Biopsy methods are discussed, and there is a short general chapter on surgery. The account of radiotherapy wastes space on elementary radiation physics and technical aspects of X-ray therapy which have had to be so condensed as to have little value. Cancer of the skin is well described and illustrated, and there are useful notes on ætiology and on the lesions which simulate skin cancer. The section on treatment of cancer of the mouth and tongue is poor, the diagram of radium implantation of the tongue showing an old-fashioned type of implant. The discussion of cancer of the larynx shows the influence of the French school, and the descriptions of the various cancers found in the alimentary tract, from œsophagus to rectum, should be very useful to senior students. The authors insist on the curability of cancer of the female generative organs. The book is completed by sections on tumours of bone, sarcoma of the soft tissues, and Hodgkin's disease and the leukæmias.

Well planned and readable, the book will be serviceable to all cancer students, though radium is not given its true place as the most effective weapon we have at present against many of the accessible cancers. The important work of the British school on radium dosage, and the results obtained, are almost ignored, which must inevitably bias the choice of treatment in America.

Manual of Physical Diagnosis (3rd ed. Chicago: Year Book Publishers; London: H. K. Lewis. 1947. Pp. 351. 27*s.* 6*d.*).—It is only meet that a steady stream of books on physical diagnosis should be issuing from the home of laboratory medicine. The special feature of this one is that it is concerned mainly with the respiratory and circulatory systems, although there are also brief sections dealing with the abdomen, the genitalia, and the central nervous system. Dr. Ellis B. Freilich, Dr. George C. Coe, and Dr. Joseph Freilich have made a laudable attempt to correlate physical signs and pathology, and the book can be safely recommended to the student as an introduction to clinical medicine.

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THE LANCET

LONDON: SATURDAY, DEC. 27, 1947

Health at the University

A CONFERENCE held last summer [1] at the Institute of Social Medicine in Oxford, and attended by delegates from 15 universities, 11 medical schools, and various other important bodies, gave the academic world a signal for action. It has long been recognised that welfare provisions in British universities are in many ways inadequate, and that the health and sickness of students have had too little attention. Abroad, organised health examinations, including radiography of the chest, were instituted in Munich as early as 1927 and later extended through the German universities; in the United States the leading universities have set an example in the same way; and in 1938 an international university conference devoted five days to a discussion in which 50 representatives from 15 nations advocated compulsory health examination. Both the Goodenough Committee and the Royal College of Physicians committee on social and preventive medicine have strongly recommended the universities to establish student health services, and the students themselves—through the National Union of Students, the British Medical Students Association, and other groups—have sent out questionaries and published thoughtful memoranda on their own needs. Of recent years a few British universities and several medical schools have started partial services; but a fully operative service, making proper provision for periodic health examination and care in sickness, has yet to be announced. While memoranda have accumulated, and a few pioneer undertakings have been launched, the governing bodies of all but a few universities have remained largely inactive: they have had other pressing responsibilities, accentuated by war and its sequelæ. Now, however, there are signs of awakening interest, and the inauguration of the National Health Service (though in its early phases it will be more concerned with sickness than with health) should provide an occasion for new thought and concerted enterprise.

With the costs of illness covered, those who have to provide for the young will increasingly concentrate on earlier detection of defects and on the prevention of any form of disability; and the success of child-welfare centres and school medical services fully justifies extension of interest to the next age-group. The university student is, after all, still in a stage of growth and development: like the youthful entrant to industry, for whom special welfare measures are now required, he is exposed to new hazards on leaving home and school, and for medical students in particular these include exposure to tuberculosis and other infections. Furthermore, the undergraduate is at a stage of his educational career when the contribution of health to the evolution of the "whole man" can be usefully emphasised and related to the general academic culture. Nowadays too many of those admitted to universities on the score of scholarship are found to be of poor physique and liable to break down under the stress of a curriculum ill adjusted in its mental and physical demands. Surely the time has come to recognise that the health of this large body of young and partially selected adults, from whose ranks will be drawn a high proportion of the leaders and teachers of the future, matters at least as much as the health of recruits to the Armed Forces.

This week we publish papers by physicians concerned in various ways with student health at universities of widely differing character and tradition. Dr. PARNELL, of Oxford, describes the findings in a group of students presenting themselves voluntarily for a health examination, and refers to the need of many of them for simple psychological help. Dr. MACKLIN, of Aberdeen, presents the case for a comprehensive service and reviews organisation, staffing, and costs. He thinks that the same doctor should be responsible for health and sickness, and that he should have beds for investigation and for the treatment of minor illness. Dr. BOLTON, of Birmingham, develops the interesting theme of compulsory physical education during the first undergraduate year, claiming a place for it in the curriculum and emphasising the social as well as the physiological benefits of a well-organised system allowing the student plenty of choice. No doubt he is right in saying that "the native resentment of compulsion is, after all, something of a bogy." At British universities compulsory medical examination has never been suggested as a means of selection or exclusion; it takes place after entry and is intended to give the student a better prospect of enjoying and profiting by his scholastic course and of avoiding interruptions by sickness. Again, in favour of making physical education compulsory Dr. BOLTON can fairly plead that mental education is already based on compulsion; attendance at lectures has long been obligatory, and compulsory attendance on the field or in the gymnasium he regards as a corollary, designed to bring physiological and social balance into a system which has put too much emphasis on midnight oil and competitive examinations. If it is really true, as preliminary surveys suggest, that some 80% of university students take no regular part in games or other health-giving outdoor activity, it is certainly time that the conditions and purposes of a modern university training were reviewed. In the hands of some of its Continental exponents the cult of physical fitness has shown an unattractive side; and most of us like to think of a university as a place where undergraduates enjoy a great deal of freedom—especially perhaps, to make mistakes. There must, however, be many remedies besides compulsion applicable to institutions where a majority of young people do not follow their natural bent towards athletic pursuits, and undoubtedly a great deal more could usefully be done for the average student—even if the aim is simply to make him healthy enough to be unaware of his health. There will be warm support for our colleagues who take up this important new work.

1. *Lancet*, 1947, ii, 318.

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Three Drugs against Tuberculosis

AMONG the bacterial infections which have hitherto proved resistant to chemotherapy, pulmonary tuberculosis stands out as the main killing disease affecting the productive groups of the population. Hence the keen public interest taken in any agent found to be active against *Mycobacterium tuberculosis*. In his Mitchell lecture last year, HART [1] divided these agents into purely synthetic substances with no known counterpart in nature; synthetic compounds related to some natural substance which has served as starting-point of the series; and substances of biological origin. Clinical trials of a representative of each of these three categories have been reported within the past few weeks.

'Sulphetrone,' a promin-like substance, was synthetically prepared in 1936, but its antituberculous properties were not recognised until 1941. It is more soluble in water and considerably less toxic than many other sulphones. It exerts a moderately suppressive effect on experimental tuberculosis in guineapigs, and this effect is enhanced by synergistic action when the drug is used in conjunction with streptomycin. Last week MADIGAN and his colleagues [2] reported 6 cases treated with sulphetrone by mouth and streptomycin parenterally, and 11 cases given streptomycin alone. Owing to the small numbers, the variety of clinical types, and the absence of controls, the results are difficult to assess and comparison between the two groups is open to doubt. In both, temporary regression seems to have been produced, particularly in miliary tuberculosis, but relapses have tended to follow later, sometimes associated with the development of streptomycin-resistant strains of the tubercle bacillus. Nevertheless, the experimental evidence of synergism between sulphetrone and streptomycin, coupled with the possibility of maintaining reasonable blood-levels of sulphetrone in man safely for long periods, suggests that this combination should be tried in larger and more homogeneous series of selected types of disease, especially acute miliary and meningeal tuberculosis. This preliminary trial makes it unlikely that the onset of streptomycin-resistance can be retarded or prevented by the coincident use of sulphetrone, for increased resistance was found in strains isolated from patients after three months' treatment with both drugs together.

The introduction of *para*-aminosalicylic acid (P.A.S.) by LEHMANN [3] arose from BERNHEIM's observations that the addition of benzoic and salicylic acids increased the oxygen uptake of washed suspensions of tubercle bacilli; this suggested that substituted similar compounds might interfere with the normal oxidations of the bacilli and so inhibit growth. The Swedish workers found P.A.S. strongly toxic to guineapigs, but FELDMAN and others [4] at the Mayo Clinic demonstrated considerable suppression of experimental tuberculosis in these animals. Owing to the difficulties of manufacture and the large doses required, P.A.S. has been scarce, but about 100 cases of various types of clinical tuberculosis have been treated with it in Sweden.[5] The drug was given mainly by mouth and no serious toxic effects were noted. The reasons for crediting the drug with the improvements noted were not strong, and acute miliary and meningeal tuberculosis were unaffected. The 19 pulmonary cases, 13 of them complicated by other lesions, treated with this drug at Grove Park Hospital and lately reported by DEMPSEY and LOGG,[6] also showed a suggestive though not convincing response.

Recent reports on streptomycin confirm its clinical promise in some tuberculous conditions. The preliminary review [7] of the investigation on which the United States Veterans Administration and Army and Navy have been engaged since June, 1946, covers 543 patients, including 245 pulmonary and 84 miliary and meningeal cases who had finished treatment or died. This account should be taken in conjunction with the recommendations of the American Trudeau Society,[8] published simultaneously. Outstanding findings are the regressive effects of streptomycin in acute miliary tuberculosis and tuberculous meningitis, already demonstrated by the Medical Research Council trial in this country. Striking benefit was also noted in laryngeal and tracheobronchial ulcerations, and in cutaneous sinuses, conditions which can be directly observed. Regarding pulmonary tuberculosis the provisional verdict is much more cautious. As would be expected, chronic fibrocaseous disease is little affected and chronic cavities rarely close. The exudative elements of pulmonary tuberculosis, including bronchopneumonia, seemed to run a more favourable course, compared with past clinical experience—not a very reliable guide—but the improvement was most definite during the first three months of therapy; relapses sometimes occurred during the latter part of the course and were noted in a fifth of the cases after the cessation of treatment; seldom, moreover, did all exudative lesions resolve in a given patient. The two bugbears of streptomycin are acquired resistance and chronic toxicity (particularly affecting the labyrinth), and on account of these the American workers advise against its use in minimal or early pulmonary tuberculosis with favourable prognosis, or where conventional therapy seems likely to be effective. Thus in pulmonary tuberculosis streptomycin must be looked on as an adjunct to the well-established methods of treatment. In genito-urinary and bone and joint tuberculosis the limited trials have so far yielded inconclusive results. The broad conclusions of these American reports are reinforced by the preliminary results in tuberculous meningitis treated at the Sick Children's Hospital, Paris.[9] Of the 118 children receiving streptomycin, 46 who have been treated for from two to ten months are "behaving like normal beings," though their ultimate fate is, of course, an open question and the number given in the detailed table (of later date than the text) as "well" or "condition good" is only 25. The experience in Paris emphasises the vital factor of early diagnosis (and the value of retinal examination); the importance of steering between inadequate dosage

1. Hart, P. D'Arcy *Brit. med. J.* 1946, ii, 805, 849.
2. Madigan, D. G., Swift, P. N., Brownlee, G., Payling Wright, G. *Lancet*, Dec. 20, p. 897.
3. Lehmann, J. *Ibid*, 1946, i, 15.
4. Feldman, W. H., Karlson, A. G., Hinshaw, H. C. *Proc. Mayo Clin.* 1947, **22**, 473.
5. Vallentin, G. *Svenska Läkartidn.* 1946, **43**, 2047. Alin, K., Difs, H. *Nord. Med.* 1947, **33**, 151.
6. Dempsey, T. G., Logg, M. H. *Lancet*, Dec. 13, p. 871.
7. *J. Amer. med. Ass.* 1947, **135**, 634.
8. *Ibid*, p. 641.
9. Debré, R., St. Thieffry, Brissaud, E., Noufflard, H. *Brit. med. J.* Dec. 6, p. 897.

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and an amount sufficient to cause toxic reactions (particularly those related to thecal or meningeal irritation); and the possible significance of the lymphocyte-count of the cerebrospinal fluid in prognosis. Streptomycin is clearly of short-term radical benefit in some cases of tuberculous meningitis, though the various factors involved and the best schedule of administration have yet to be worked out. Much will be expected on these points from the current Medical Research Council trials.

The discovery that tuberculosis can after all be affected by systemic drugs may lead enthusiasts to disregard the strict criteria for assessing the efficacy of treatment ably set out by HINSHAW and FELDMAN.[10] There are already signs that the improvement noted in a hotch-potch of cases, without untreated controls, will be ascribed to some new drug, without regard to the possibility of spontaneous remission. If this happens the pre-streptomycin story of faded hopes will be repeated. It took but a few months of enterprise to introduce tuberculin and 'Sanocrysin' into treatment on a world scale, but more than a decade of scientific slogging to evict them. With streptomycin we have the impressive results in meningitis and miliary tuberculosis to justify the setting up of a limited public service by the Ministry of Health on the advice of the Medical Research Council. But the indiscriminate use of the drug in every type of tuberculosis, which commercial vigour has stimulated in the U.S.A., must be guarded against. Apart from risk to the patient of his tubercle bacilli becoming streptomycin-resistant, there is the wider public-health danger of new cases arising in which the strain is primarily resistant—for example, in infants infected by mothers treated with streptomycin. So the M.R.C. has the unenviable responsibility, not only of assessing the value of the antibiotic and deciding on the best schemes of dosage in various forms of tuberculosis, but also of advising how it should be distributed for public use in appropriate conditions only. While British production is in the pilot stage the council is unlikely to be hustled.

Fibrocystic Disease of the Pancreas

INFANTS who fail to thrive and eventually succumb from a combination of diarrhœa and respiratory infection are sadly familiar in practice. The necropsy usually discloses no convincing cause of death, and doubt remains as to which of the two main symptoms was primary or whether both were secondary to some other fundamental disturbance of nutrition. It now appears that in at least a considerable proportion of these cases there are widespread pathological changes in the pancreas which interfere with the secretion of pancreatic juice and thus impair digestion. Other changes in the body may be secondary to malabsorption of essential foods and vitamins. The principal necropsy finding in the pancreas is dilatation of the acini and ductules from blockage of the lumen with tenacious inspissated material; and the surrounding tissue undergoes pressure atrophy and progressive fibrosis. The condition has been named "fibrocystic disease of the pancreas," but there is no true cyst formation, and the fibrous tissue which develops is not prominent in early cases and must be considered secondary. These changes are present at birth and are progressive. There is no evidence of infection and the islet tissue is intact. The main pancreatic duct is normal, and the few cases in which atresia has been reported probably represent a separate condition with somewhat similar clinical effects. According to HOWARD[1] there is a fairly high familial incidence. Chronic suppurative inflammatory changes in the lungs are constantly found in those infants who survive for more than a few weeks; these consist of varying degrees of purulent bronchitis, bronchiectasis, or bronchiolectasis. The respiratory passages are obstructed with tenacious mucoid or mucopurulent material, and the walls are infiltrated with inflammatory cells. Fibrosis follows in those who survive. Keratinising squamous metaplasia is sometimes present in the trachea and bronchi, and occasionally in other organs. Fatty changes in the liver are a common finding.

Isolated instances of this pancreatic disorder, encountered post mortem, have been reported for some years; but its association with symptoms and signs during life was not appreciated and its frequency was quite unsuspected until ANDERSEN[2] drew attention to it in 1938. Her paper was closely followed by three others,[3] each reporting a considerable series of cases, and there have since been numerous reports. There are several reasons for this delay in identifying what now seems to be a definite clinical and pathological entity. In the first place, pathologists did not recognise the condition because, despite the striking microscopical changes, there is usually little to be seen with the naked eye; and they had not been accustomed to making routine sections of the pancreas in infants or young children who had apparently died of respiratory disease. However, with increasing awareness and suspicion, the incidence has been established at about 3% of all infants who come to necropsy[4]; though in one series[5] the incidence was as high as 12%. Clinically, the condition was not recognised because of its similarity to other disorders, particularly respiratory and gastro-intestinal infections in infants and cœliac disease in older children. Symptoms usually appear soon after birth, and infants may die within a few days with intestinal obstruction due to meconium ileus, which is believed to result from the lack of pancreatic enzymes. In other cases symptoms do not develop until later in childhood. Manifestations may be divided into three main groups: gastro-intestinal, respiratory, and nutritional. Digestion is impaired through lack of trypsin, amylase, and lipase; the stools, which are at first loose, become pale and bulky when solid foods are given. Cough develops early and becomes increasingly troublesome; scattered physical signs may be found in the chest, but there is no evidence of frank consolidation. In infancy, X-ray examination is not likely to show more than increased hilar shadows and basal markings; but later on, if the child survives, there will be patchy areas of opacity from consolidation, collapse, and emphysema. The general picture

10. Hinshaw, H. C., Feldman, W. H. *Amer. Rev. Tuberc.* 1944, **50**, 202.

1. Howard, P. J. *Amer. J. Dis. Child.* 1944, **68**, 330.
2. Andersen, D. H. *Ibid*, 1938, **56**, 344.
3. Harper, M. *Arch. Dis. Childh.* 1938, **13**, 45. Thomas, J., Schultz, F. W. *Amer. J. Dis. Child.* 1938, **56**, 336. Blackfan, K. D., May, C. D. *J. Pediat.* 1938, **13**, 627.
4. Menten, M. L., Middleton, T. O. *Amer. J. Dis. Child.* 1944, **67**, 355.
5. Farber, S. *Ibid*, 1942, **64**, 953.

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resembles that of any chronic wasting illness with secondary bronchopneumonia. In spite of a good appetite, the infant becomes increasingly undernourished. Cœliac disease rarely develops before the age of nine months, and the association of chest symptoms with loose stools should suggest pancreatic disease. The diagnosis can be confirmed by examining the pancreatic juice. All the pancreatic enzymes are deficient, but it is only necessary to estimate the trypsin, which is not difficult. A duodenal tube is passed, preferably under X-ray control, and the power of the juice to digest gelatin is analysed by the methods of ANDERSEN and EARLY.[6] Chemical examination of the stools and other laboratory tests are not of diagnostic value, for they merely reveal the presence of malabsorption and malnutrition. The glucose-tolerance curve is usually normal; nitrogen excretion is increased; and changes in the fat content of the stools are similar to those in cœliac disease, the fat being partially split by a lipase in the succus entericus but too late for proper absorption. The vitamin-A absorption curve is low, and this was at one time suggested as a diagnostic finding; but it may be found in any condition associated with impaired fat-absorption. The condition resembles cœliac disease in the wasting, distension, and diminished fat-absorption, but cœliac disease can be distinguished by the later onset of symptoms, the poor appetite, the lack of constant respiratory infection, and the normal enzyme content of the duodenal juice.

The fundamental cause of fibrocystic disease of the pancreas remains a mystery. At one time it was suggested that the whole condition might arise from vitamin-A deficiency, but more probably this deficiency, when present, is a secondary manifestation. Other possibilities are congenital malformations or inflammation of the pancreas during fœtal life. FARBER [7] believes that the basic lesion is a physically altered secretion which obstructs the small pancreatic ducts; and with this disorder he has found evidence of similar changes in secretion elsewhere in the body, especially in the lungs, duodenum, and biliary tracts. He postulates that this results from disturbance of autonomic nervous control, and he claims to have produced similar lesions experimentally in kittens. There is no doubt, from clinical observations, that lack of pancreatic juice is responsible for the diarrhœa and malnutrition, and these can be greatly improved by treatment. The intake of food must not only be sufficient to cover the inevitable losses through imperfect digestion, but enough to satisfy the requirements of appetite, energy, and growth. Full use should be made of modern predigested foods; casein hydrolysates can now be obtained in palatable form, and if given in sufficient quantity will supply all the protein needed. To these may be added extra carbohydrate, in the form of glucose, minerals, and vitamins; and pancreatin can usefully be given with solid foods when these are begun. Chemotherapy and penicillin have materially improved the outlook as regards the respiratory infection; but suppurative changes in the lungs, once started, are likely to progress, and the pancreatic lesion itself is irreversible. While the ætiology remains obscure, therefore, the outlook for these cases is poor.

6. Anderson, D. H., Early, M. V. *Ibid*, 1942, **63**, 891.
7. Farber, S. *Arch. Path., Chicago*, 1944, **37**, 238.

Annotations

CHLOROMYCETIN: AN ANTIBIOTIC EFFECTIVE BY MOUTH

THE latest antibiotic is derived from a streptomyces found in a sample of soil brought from Caracas, Venezuela.[1] From filtrates of submerged aerated cultures of this organism a crystalline substance, chloromycetin, has been obtained. This is probably a chemical entity, since it has a definite composition, melting-point, and optical rotation, and it is unique in containing both nitrogen and non-ionic chlorine. Unlike penicillin it is stable over a wide range of pH and will withstand boiling for five hours. Chloromycetin is active in vitro in dilutions of 1 in 3,000,000 against *Brucella abortus*, *Bact. coli*, *Friedländer's bacillus*, *Proteus vulgaris*, and *Staphylococcus aureus*, and in much higher concentrations (1 in 80,000) against the tubercle bacillus. Judging by tests on mice it should be possible to get a concentration of 1 in 80,000 in human tissues without producing toxic effects. Its discoverers have not yet performed in-vivo tests with chloromycetin in tuberculosis, but screening tests with the pure material showed a striking chemotherapeutic activity against *Rickettsia prowazeki*, using chick embryos, and against a number of other rickettsial agents when tested on embryonated eggs.[2] From 24 eggs infected with the Gilliam strain of *R. orientalis* and protected by chloromycetin 8 live chicks were eventually hatched. The chemotherapeutic effect of the drug in mice infected with scrub-typhus was equally satisfactory, even when it was administered as late as ten days after infecting the animals.

These preliminary observations suggest that chloromycetin is well worth a clinical trial in tuberculosis and rickettsial infections. It not only is of low toxicity but has the great merit of being active when given by mouth, and in rickettsial infections it is effective late in the disease. At the moment the only promising drug against the rickettsias is *p*-aminobenzoic acid, which is not free from toxic effects.

IMMUNISATION AND THE DIPHTHERIA CARRIER-RATE

DOES mass-immunisation against diphtheria increase the carrier-rate among immunised children? In the opinion of Dr. V. F. Soothill,[3] M.O.H. of Norwich, this question has still to be satisfactorily answered. During the spring of 1944, a period of low incidence of diphtheria in Norwich, he made a random selection from the immunisation records of 100 children of each sex in the age-groups 2–5, 5–10, and 10–14 years. Care was taken to choose children attending well-scattered schools or welfare centres, or living in appropriate districts. As controls, a random selection of "comparable" children was made among the non-immunised. Immunised children were further divided into those whose post-Schick tests were known to be negative and those who had not been Schick tested. The checked counts of immunised Schick-immunes were 1333 immunised and 1061 non-immunised. Allowing for the immunised with and without negative post-Schick tests, these totals became: immunised 1377, non-immunised 1017. Swabbings from nose and throat obtained from all children in the latter two groups were examined for *C. diphtheriæ* and yielded 2 positive results in each group.

Unsatisfied with this statistically insignificant result, Soothill arranged for the experiment to be repeated, using the same groups of children, in the winter of 1944–45 when it was thought that *C. diphtheriæ* was more abundant. Except that a different school nurse

1. *Science*, 1947, **106**, 417.
2. *Ibid*, p. 418.
3. *Med. Offr*, 1947, **78**, 191.

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took the swabs, the conditions were the same. This time, the immunised yielded 2 carriers and the non-immunised none. With the exception of one avirulent *mitis* strain, all the *C. diphtheriæ* recovered were of the *intermedius* type (the cause of the few cases of clinical diphtheria in the city hospital). Soothill points out that, though still not statistically significant, these figures are comparable with those reported by the L.C.C. Public Health Department.[4] A parallel investigation in June, 1944, among 200 adults, mainly factory workers, drawn from widely separated parts of Norwich produced completely negative results.

Though gratified as an epidemiologist, Soothill is still unsatisfied as a statistician, and he asks for more investigations of carrier-rates among immunes and non-immunes, account being taken not only of the state of immunity but also of the degree of exposure. It is useless, as he says, to compare closed with open communities. In the former immunisation may not prevent a temporary rise in the carrier-rate if diphtheria is endemic,[5] but in communities where immunisation is extended to the greater part of the most susceptible population—the pre-school and school children—McKinnon [6] points out that there is a fall in the incidence of clinical cases and carriers and that both classes in the end virtually disappear. Thus in Toronto (population 650,000) in 1926, a pre-immunisation year, there were 1098 cases of diphtheria with 90 deaths, and 13,231 swabs were examined of which 2564 were positive. In 1936, when 104,449 persons were known to have been immunised, there were 48 cases of diphtheria with 2 deaths, and 4307 swabs were examined of which 80 were positive. In 1937, surveys of 1774 school-children in Montreal yielded only 2 carriers. The figures for Canadian cities in 1947, ten years later, when they are published, should be conclusive enough to satisfy the most sceptical.

AMINO-ACIDS TO INCREASE PERIPHERAL BLOOD

PROTEINS by virtue of their specific dynamic action are well known to increase heat-production in the body, but there is some doubt whether this increase is accompanied by a rise in the skin temperature of the extremities.[7] The specific dynamic action of proteins mainly depends on the presence of a few amino-acids, particularly glycine, alanine, phenylalanine, and tyrosine. Gubner and his colleagues [8] have given glycine in doses of 20 g. by mouth, dissolved in 200–300 ml. of milk, to 25 subjects, some of whom had peripheral vascular disease. In 18 of these the average maximal rise in oxygen consumption above the basal level was 18·4%, but there was a considerable variation in the individual figures and in 4 subjects there was no significant rise in consumption. Skin temperatures were measured in 11 normal people and in 4 patients with peripheral vascular disease, and the glycine was found to raise the temperature of toes and fingers in 3 out of the 4 patients. The rise was greatest in the toes, and the normals showed a rise of 4°C, compared with 2·3°C in the patients. In 6 cases a posterior tibial nerve block was found to have much the same effect as glycine on skin temperature. Glycine produced a significantly greater rise of skin temperature than the ingestion of alcohol. Oscillometric pulsation in the calf was increased after the ingestion of glycine in 8 out of the 11 normal subjects, but in none of the patients with peripheral vascular disease, even though 2 of the patients had significant rises in skin temperature. Blood-flow to the extremities, as measured by venous occlusion plethysmography, was increased by glycine, the average rise being 62% in 4 normal subjects, and 30·5% in 4 patients with peripheral vascular disease. This increase is the result of peripheral vasodilatation and increased cardiac output.

Much of the early work on peripheral vascular diseases has had to be discarded because of faulty technique, so there is a natural tendency to be cautious in accepting new observations. This investigation, however, seems to have been well controlled, and if it is confirmed it will undoubtedly stimulate others to explore its practical applications.

4. *Lancet*, 1947, 1, 668.
5. Dudley, S. F., May, P. M., O'Flynn, J. A. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1934, no. 195.
6. McKinnon, N. E., in Control of Common Fevers, London, 1942, p. 47.
7. Richards, R. L. Peripheral Circulation in Health and Disease, Edinburgh, 1946, p. 35.
8. Gubner, R., Di Palma, J. R., Moore, E. *Amer. J. med. Sci.* 1947, **213**, 46.

RISKS OF LOCAL SULPHONAMIDES

THE Home Office has drawn the attention of trade and other organisations to the Poisons (Amendment) Rules, 1947, which were made by the Secretary of State on Nov. 28. Among other matters these rules allow some relaxation in the restrictions now imposed on the sale of ointments and dressings containing sulphonamides. On and after Jan. 1, 1948, it will be lawful to sell these preparations without a doctor's prescription; but, as the ointments are subject to the provisions of section 18 (2) of the Pharmacy and Poisons Act, 1933, their sale must still be entered in the poisons book and the purchaser's signature obtained.

Most dermatologists will regret this step, for it is they who see the disasters which occur from the injudicious use of sulphonamides when employed for topical therapy. The necessity for obtaining the customer's signature may check sales, but there is a risk that injudicious self-medication will lead to major and minor catastrophes. In his masterly survey of the use of sulphonamides in dermatology Barber [1] expressed doubt whether the use of drugs of this series as local applications in superficial infective dermatoses such as impetigo contagiosa possessed any advantages over rational treatment with older and safer remedies. A similar view was forcibly expressed in the *Army Medical Department Bulletin* [2] in 1943 when sick-wastage from sulphonamide dermatitis was causing much concern. MacKenna [3] has pointed out that local applications of sulphonamides may cause three types of sensitisation—local sensitisation, general sensitisation, and photosensitivity. When local sensitisation occurs, an eczematous reaction with erythema and vesicle formation develops at the site of application; often this is interpreted by the patient as indicating that the original malady is gaining ground, and more vigorous measures may be taken to cure the infection, with disastrous results. General sensitisation is usually accompanied by exacerbation of the local lesions, fever, facial œdema, severe pruritus, and a generalised rash which may be erythematomacular or vesicular or occasionally bullous. Photosensitivity leads to the development of severe sunburn effects on areas of skin exposed to minimal degrees of sunlight, and this photosensitivity may persist for many weeks.

Dermatological literature throughout the world is studded with reports and discussions concerning the hazards of local sulphonamide treatment, but it is agreed that the drugs are used in a large number of cases without ill effect. Hitherto the disasters have been few, though their percentage incidence is not known. Phillips [4] found that among 2430 dermatological patients who passed through the wards of several military hospitals there were 100 cases of sulphonamide dermatitis—an incidence of 4·11%—but we have no knowledge of the size of the population at risk. Manufacturers will no doubt arrange for the preparations sold to the public to be clearly labelled so that the user is warned never to

1. Barber, H. W. *Practitioner*, 1944, **152**, 281.
2. 1943, **29**, 226.
3. MacKenna, R. M. B. *Med. Ann.* 1945, p. 307.
4. Phillips, B. *Brit. J. Derm.* 1946, **58**, 213.

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apply the remedy for longer than seven to ten days, for sensitisation seldom develops if this rule is obeyed when local treatment with sulphonamides is first adopted. It will be interesting to see how they overcome the hazard of sensitisation from repeated applications of the remedies for short periods at irregular intervals. Meanwhile doctors in general practice should bear in mind the possible dangers.

THE PRACTITIONER'S INCOME

IN spite of (or maybe because of) the wealth of alternative calculations offered in the Minister's reply, many general practitioners have found a new and a puzzling pastime in figuring out what their individual incomes would be. The results, like those of other Christmas games, have depended a good deal on the psychological make-up of the participants. For a general practitioner in a mixed panel and private practice it may in fact be very difficult to determine just what his prospects are. It is of course easy to take the global sum of £40,826,250, which is to be paid for the general-practitioner service, and divide it by the likely number of practitioners (Mr. Bevan's estimate is 17,900), and so get an average income of £2280. But this is cold comfort. Few doctors will take much interest in this calculation: what they want to know is not the average income but their own expectations, and the truth must remain that there are so many variable factors that no simple formula can be of any real help. All we can do is to consider probabilities.

The first and most stable factor is the doctor's present panel list. Those patients already on this list will automatically remain with him if he joins the service—subject of course to their continued right to change their doctor whenever they choose. The patients on the panel list, if any, provide a firm and calculable nucleus, and one may confidently add to them their dependants. It is usually held that on the average the ratio of dependants to panel patients is 1·2 to 1. So for every 100 patients on his present list the doctor might reasonably count on some 220 in the future. After this, exactitude can hardly be pursued; for, except in closed communities served only by a single doctor or partnership, it is virtually impossible for any doctor to say with confidence at any given moment just how many private patients he cares for. Ledgers help very little. They seldom show the size of families, or keep a tally changing as some members of the family reach insurable age and others are born or die. In urban practice it is not always easy to know whether a particular family, not seen over a long period, is enjoying exceptionally good health or has transferred allegiance to another doctor. Again, few can be sure what proportion of the residents in their area will use the new service; which makes it difficult to guess the likely number of capitation fees, and even harder to estimate how much income may still accrue from private practice. Nor do we yet know how many doctors will be allowed to augment their incomes (and to what extent) by taking part in the maternity service.

On expenses some saving may be expected. The doctor will still (pending health centres) have to maintain his own surgery and his paid (and unpaid) staff, his car, his telephones, and his correspondence; but there should be a considerable saving for drugs, and dispensing, accountancy should cost less, and bad debts and the "free list" should disappear. The sources of occasional, or regular, additional income now enjoyed by general practitioners (such as insurance examinations, factory or other part-time appointments, pensions or recruiting boards) will not run dry, and some new springs are likely to appear; for the Minister speaks of "allowances for training assistants," and it seems certain, too, that in some areas graded specialist service in hospitals or clinics (paid on a sessional basis) will fall to the lot of those practitioners who are recognised by their colleagues as acceptable for this work. Add to this the hidden asset of superannuation rights, and the range of remuneration seems, as we said last week, reasonable though not lavish. It is true that the cost of living has risen steeply; but it will be recalled that Prof. Bradford Hill calculated for the Spens Committee that the gross income *from all sources* of general practitioners in 1939 was in the neighbourhood of £28,285,000. He assumed a similar total of practitioners to that now estimated by the Minister; so we can justifiably contrast his global figure with that now offered by the Treasury. The £40,826,250 offered does therefore represent a substantial increase, particularly when one remembers that in addition to it the gross total future income of doctors will include private fees for general practice; the remuneration received from industry, insurance societies, the hospital boards, and the Ministries of War, Pensions, Education, &c.; the fees received for public and private maternity work; the allowances for training assistants; and the State's share of the superannuation contribution.

Just how it will all work out remains to be seen. Inequalities of opportunity in the early days seem inevitable, though they need not amount to injustice if the time remaining before the appointed day is wisely used. In any service paid preponderantly by capitation fee it seems obvious that opportunity should be provided, well before the commencement of operation of the service, both for the doctors to express their willingness to serve, and for patients hitherto uninsured to state their intention of using the service and their choice of doctor. Any curtailing of this preliminary preparatory period, which should last at least three months, would mean that an inordinately large share of the pool would go to those doctors fortunate enough to have already a very large panel, or skilful enough to be able to collect quickly the maximum of signatures of their newly arriving State patients. Once we recognise this, and are agreed on the undesirability of any unfair and undignified last-minute scramble, it becomes obvious that the time for decision is short—probably no more than half of the six months that separate us from July 5. It is later than we think. It is all the more urgent, therefore, for practitioners to relate the Minister's proposals to their own practices and lives, and to decide whether his offer is one which they can accept.

B.M.A. AND PLEBISCITE

ON Dec. 17 the council of the British Medical Association met to consider the Minister's reply to the Negotiating Committee. In a statement to the press it says:

"... for nearly a year we have worked at the conference table to no purpose. There remains one final question and one central issue. Does the service as described by the Minister conflict with the traditions and standards of a great profession? There is only one answer the council of the association can give to this question. It does so conflict."

On Jan. 31 a plebiscite of the whole profession will be taken.

THE gift of over £1 million which South Africa made last year to the British people included £196,625 from Durban and Natal. Of this sum £106,888 is to go to the Institute of Child Health of the University of London, for a new separate building near Great Ormond Street Hospital. This will house a model welfare clinic and other services developed with the local authority. The institute's director is Prof. Alan Moncrieff.

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Special Articles

MASS RADIOGRAPHY IN THE EARLY DIAGNOSIS OF CHEST DISEASE

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THE early diagnosis of pulmonary tuberculosis and other important chest diseases still leaves much to be desired. Routine mass radiography of certain groups of the population was recommended by the Medical Research Council (1942) to detect unsuspected cases in the early asymptomatic stage. An ambitious programme was initiated during the war by the then Minister of Health, and the results of three surveys made by the Medical Research Council (1945) gave impetus to the scheme, which has since gained the enthusiastic support of many able and experienced workers in the field, particularly those who have witnessed the spectacular success of mass radiography in the Armed Forces.

Mass-radiography surveys of the civilian population, however, are a vastly different proposition from the screening or sifting of military personnel under Service conditions. Brailsford (1943) was one of the first to cast doubt on the wisdom and practicability of the official scheme; and Toussaint and Pritchard (1945) developed instead, with outstanding success, what has since been known as the Bermondsey scheme, in which practitioners are encouraged to send all their suspicious cases for X-ray examination.

It is perfectly true that "one type of case will be detected only by mass radiography: the person with unsuspected, possibly infective, chronic disease whose symptoms are insufficient to take him to a doctor" (Medical Research Council 1945). Active tuberculosis, however, has been found in only 0·4% of all the cases so far examined by mass radiography, and not nearly all of these have been symptom-free. Though Kahan and Close (1944) report that in none of their 138 cases of pulmonary tuberculosis picked up in a mass survey of naval ratings had the men ever reported sick or had symptoms such as to cause them to seek medical advice, in the surveys of the Medical Research Council (1945) of 79 "treatment cases" (out of 21,280 persons radiographed) only 29 were symptomless, and of the 50 patients with symptoms, 17 had already consulted a doctor. In other words, in rather more than a fifth of the "unsuspected" cases the patients had had symptoms for which they had sought medical advice, but in all of them the diagnosis had been missed because radiography was not used in time.

No information is given about the incidence of symptoms of non-tuberculous chest diseases found by mass radiography. The incidence of chest abnormalities other than tuberculosis discovered by mass radiography is 1–1·3%, but only a small proportion of these conditions, which include cervical ribs, pleural thickening, and calcified glands, need treatment. There will hardly be many asymptomatic cases of bronchial carcinoma, bronchiectasis, pneumoconiosis, or cardiovascular diseases which show definite radiological abnormalities.

The facts (1) that only by mass radiography can pulmonary tuberculosis and certain other chest abnormalities be detected in the presymptomatic stage (which is not necessarily an early stage); (2) that even the presence of certain symptoms, such as cough or lassitude, often does not lead the patient to the doctor; and (3) that in spite of definite radiological appearances physical signs are sometimes absent and tubercle bacilli not found in the sputum, have wrongly led to the conclusion that mass radiography is the method of choice in diagnosing early cases for treatment and thus in preventing the spread of pulmonary tuberculosis. It was hoped that nation-wide periodical mass radiography would soon become a reality, and the method was regarded as the answer to the question of diagnosis.

THE CLINICAL ASPECT

The clinician, be he tuberculosis officer or sanatorium physician, who has to deal with the cases as they arise sees the grave problem of early diagnosis of chest diseases from a somewhat different aspect. The impression gained in dispensary and sanatorium work has not borne out the claims made by the supporters of the official scheme. I have previously drawn attention to the fallacies inherent in the scheme and suggested more practical and economical ways of using mass-radiography units (Hoffstaedt 1944). I review here the histories of 40 out of 145 adult male inmates of Holywood Hall Sanatorium, co. Durham. In the table these 40 cases are divided into two groups—23 patients who had undergone mass radiography before admission to the sanatorium; and 20 cases where the diagnosis of pulmonary tuberculosis had been missed or had been established much too late because radiography had not been used early enough. Group II contains 3 cases which appear also in group I.

DIAGNOSTIC HISTORY OF 40 PATIENTS

I—23 *cases examined once or more by mass radiography*

A.	Inactive clinically insignificant lesions	3	10
	Pulmonary tuberculosis not yet developed at time of examination	7	
B.	Active pulmonary tuberculosis already in advanced stage		7
	Symptomless	2	
	Ex-prisoner-of-war, mass-radiographed on repatriation	1	
	Symptoms for 3 months	1	
	Under medical treatment for 2 years with "bronchitis"	2	
	Misdiagnosed on discharge from Army in spite of suggestive radiogram and rectal fistula	1	
C.	Relatively "early" pick-ups		6
		Total	23

II—*Original diagnosis in* 20 *cases of delayed action*

Pleurodynia	2	Neglect of family history	5
Pleurisy (no action taken)	4	Neglect of history or/and presence of:	
Influenza	4	Pleurisy	3
Bronchitis, cold, catarrh, &c.	6	Hæmoptysis	3
Fibrosis of lung due to asthma-bronchitis in presence of fistula ani	1	Radiography only on request	3
Anxiety neurosis (after 6 months' hospital "observation")	1		
Muscular rheumatism	1		
Bleeding from throat	1		
Total	20		

Group I (A) consists of 10 cases where mass radiography did not help in picking up unsuspected cases of early clinical pulmonary tuberculosis. In 3 of these men there was probably no active pulmonary tuberculosis when they were radiographed. Tubercle bacilli were never found in their sputum, and after three months' sanatorium observation, and six months or more after detection of the X-ray shadow, there was no spread or activation of the supposed lesion. These 3 "patients" represent the now well-known type of mass-radiography pick-ups who are a headache for the tuberculosis officer and would be at least as well off if never discovered and if left alone. The remaining 7 patients in group I (A) developed pulmonary tuberculosis from five months to more than two years after mass radiography had given a negative result. In their case mass radiography was futile, because the men were well at the time, the only indication for radiography being routine.

Group I (B) consists of 7 cases where active pulmonary tuberculosis was discovered by mass radiography to the

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benefit of the patient; but in all of them the disease was already advanced, and mass radiography therefore did not provide early diagnosis. Of these 7 patients 2 had no symptoms, though one of the two had already developed bilateral disease with a cavity and positive sputum. Of the remaining 5 in this group 1, an ex-prisoner-of-war, had far-advanced tuberculosis when he underwent mass radiography on repatriation; 1 had had symptoms for three months when examined; and the remaining 3 were cases of "missed diagnosis" which should really have been found out without being left to chance discovery by mass radiography. These 3 cases are discussed below.

Group I (C) consists of 6 cases where a relatively early diagnosis of pulmonary tuberculosis was established by mass radiography.

Group II consists of 20 cases where the diagnosis of pulmonary tuberculosis had been missed, leading to delay in treatment; they include 3 cases from Group I (B). Among the original diagnoses "pleurodynia" figures twice; this is no diagnosis but merely a symptom.

In 4 cases the patients were treated for "influenza"; it would be grossly unfair to blame any doctor for such a diagnostic error, particularly during seasonal outbreaks of genuine influenza; but the subsequent history and, if present, a family history of pulmonary tuberculosis should arouse suspicion and lead to investigation of sputum and by radiography.

Bronchitis, catarrh, cough, and cold were the original diagnoses in 6 cases. One of the worst had been treated for "smoker's catarrh" by an Army doctor. Two of these patients, who were eventually discovered by mass radiography, had attended their doctor on and off for two years.

In 4 cases even the original diagnosis of pleurisy did not lead to further action until after most valuable time, from six months to two years, had been lost. To diagnose a pleurisy and to leave it at that without further radiography is a very serious omission.

One patient had been discharged from the Army in 1943, after six months' "observation" without ever having been radiographed, with the diagnosis of anxiety neurosis and nervous disability. When he was eventually radiographed three years later, widespread bilateral pulmonary tuberculosis with a big cavity had developed.

Another ex-Army patient had had an ischiorectal fistula since 1941 and had been discharged from the Army in 1942 with the diagnosis of lung fibrosis due to asthma-bronchitis, based on the radiogram without any regard to the presence of the fistula. In February, 1946, hæmoptysis, huskiness, and listlessness had developed. No tubercle bacilli being found in the sputum, no further action had been taken. (This shows clearly the fallacy and actual danger of negative sputum results.) In April, 1946, he had been mass-radiographed; but no report had been received. Only after inquiry in June, 1946, had he been referred to a dispensary, where tubercle bacilli had been found in his sputum, and tuberculous lesions in the upper and middle zones of the left lung.

One patient, in spite of a history of pleurisy in 1944, had been treated for six months in 1945 for muscular rheumatism until a hæmoptysis led to the diagnosis of pulmonary tuberculosis. It is strange that his family doctor had apparently not taken into consideration the highly suspicious and significant fact that both the mother and the sister of the patient had died of pulmonary tuberculosis.

Failure to take the family history into account was significant in 4 other cases. One case had been diagnosed as "bleeding from the throat." The history or the presence of hæmoptysis had been neglected in 3 cases. The omission of chest radiography in a case of hæmoptysis, however small, must be considered grave neglect. Though there are several non-tuberculous conditions which may cause a hæmoptysis, the spitting or coughing up of blood, however little, usually spells serious disease.

Finally one rather exceptional case of "missed diagnosis" is worth mentioning. A miner, aged 22, whose two sisters had died of pulmonary tuberculosis, had had pleurisy in August, 1945, and pleurisy and hæmoptysis in December, 1945, and June, 1946. After that the patient had insisted on being radiographed, with the result that he was admitted to sanatorium in September, 1946, with extensive tuberculous lesions all over the right lung and the left middle zone.

In 3 cases of this group radiography, which had at once clinched the diagnosis, had only been done on either the patient's or his mother's request.

In these 20 cases there was a time-lag, from three months to three years, between first reporting to the doctor and the establishing of the diagnosis by radiography. In most cases the delay exceeded six months.

DISCUSSION OF RESULTS

If in 20 out of 145 sanatorium patients—i.e., in 14% of the sanatorium population—pulmonary tuberculosis was not diagnosed in time, in spite of suggestive symptoms and/or suggestive history, we have no reason for complacency. If, on the other hand, the expensive machinery of mass radiography used in 23 cases was a complete waste in 10 of them, and if only 6 of the 13 pick-ups were early cases whereas 3 cases had been previously missed in spite of suspicious symptoms because they had not been radiographed in time, then there seems to be room for improvement in the use and organisation of radiography as an aid to early diagnosis of chest disease.

It is perhaps fair to assume that the experience in this sanatorium, as illustrated by the analysis of the present 40 cases, is similar to that of other clinicians; and what is true of pulmonary tuberculosis will most probably be true of other chest diseases. Mann (1943) found an average delay of $3^2/_3$ months from onset of suggestive symptoms till the patient consulted the doctor, and a nearly equal delay from the first attendance until reference to the dispensary. For obvious psychological reasons general practitioners are sometimes reluctant on mere suspicion to send a patient to a tuberculosis dispensary. Some patients refuse to attend a tuberculosis clinic for fear of publicity.

As regards early diagnosis, Fraenkel (1947) found, in five years' sanatorium admissions, only 2 cases of the earliest recognisable form of post-primary pulmonary tuberculosis. The failure in practice to diagnose tuberculosis at a reasonably early stage cannot be more impressively demonstrated than by the most alarming and disquieting statement that about half of all deaths from pulmonary tuberculosis take place within a year of notification. What, then, are the reasons for this sorry state of affairs, and what is the remedy?

CAUSES OF DELAY IN DIAGNOSIS

(1) As Jessel (1941) and Trail (1942) point out, there are reasons inherent in lung disease. The onset of the disease—e.g., pulmonary tuberculosis, pneumoconiosis, bronchial carcinoma—is usually so insidious that the patient does not seek medical advice in the early stage. It is this initial paucity, or even absence, of symptoms that forms one of the strong points in favour of routine mass radiography.

(2) Varied and deeply rooted psychological reasons on the part of the patient which have not yet been appreciated sufficiently and must be properly understood: ignorance, indolence, carelessness, and ill-developed sense of health responsibility, on the one hand, and inability to face and to accept a serious disabling disease, fear of insecurity due to loss of work, and other sources of anxiety, on the other hand, prevent many a patient from appreciating such symptoms as may be, and very often are, present.

(3) The well-established fact that chest disease of considerable extent may often present to the examining physician only inconclusive physical signs or no signs at all do not yet command due attention.

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(4) The insignificance of negative sputum results, particularly of one single direct smear, both for the diagnosis of pulmonary tuberculosis and for differential diagnosis, does not seem to be common knowledge. In fact "routine sputum examination," as suggested by Brailsford (1944), would do more harm than good if any reliance were to be placed on negative returns.

(5) Let us be frank about another psychological phenomenon. There is undoubtedly also a certain, mostly unconscious, reluctance among doctors to accept and to pronounce so serious a verdict as pulmonary tuberculosis or carcinoma. And from this very reason, though few will be prepared to admit it, any negative findings on either physical or bacteriological examination will be accepted with a sigh of relief; and, hoping for the best, the doctor dismisses his original suspicion much to the detriment of the patient.

(6) Another unpalatable fact has to be faced: doctors are not always so tuberculosis-minded as they should be. This is due to the inadequate training of medical students in tuberculosis, a deficiency of the curriculum which has already been acknowledged by various authorities.

(7) Harassed and overburdened general practitioners have not always an opportunity to take detailed case-histories of patients with minor symptoms—and it is usually with minor complaints that the trouble starts—who want a bottle of medicine rather than being questioned, stripped and tapped, and sent from one place to another, and all the rest of it.

(8) The most important factor leading to missed diagnosis and to serious delay in diagnosis and treatment is the omission of chest radiography as part and parcel of a routine chest examination—the failure to grasp that "examination of the chest is incomplete unless it includes a roentgenographic study" (Goorwitch 1944). One of the main factors contributing to this fateful omission is the lack of sufficient facilities for radiography available to the general practitioner and within easy reach of the patients, particularly in small towns and rural districts. Moreover in many areas tuberculosis dispensaries are not equipped with an X-ray plant, which means many journeys and fares and great loss of time for the patient. It must also be remembered that there are patients who dislike attending a tuberculosis clinic.

IMPRACTICABILITY OF NATION-WIDE ROUTINE MASS RADIOGRAPHY

The supporters of the official mass-radiography scheme believe, and want to make us believe, that faithful application of the official medicine is the real thing. I wonder whether these enthusiasts still believe, as they did five years ago, that "the X-ray manufacturers will shortly be ready to provide apparatus as soon as they receive orders" (*Tubercle* 1942). How are they going to turn out the teams of skilled personnel, technical and medical, to man the units which apparently were to come off the endless belt like cannon shells in munition factories? The bitter truth is that up to the end of June, 1946, only 19 units altogether were operating in England and Wales (*Lancet* 1946), which to that date had examined 1,111,000 people with the rather meagre result of picking up 4200 cases (0·4%) of active pulmonary tuberculosis. Even supposing it were possible to provide another 19 or 20 units together with skilled personnel within the next three years or so, we should still not have made much headway on the road to Utopia.

Toussaint and Pritchard (1943) said that "to deal with even 50% of the London population 20 units will be required," and Brailsford (1943) estimated that "for the Birmingham area of 2,000,000 inhabitants we should need 80 units for 3-monthly examinations." Even if Brailsford's figures are cut by half, it is obvious that, with the machines and the personnel now at our disposal, it will be impossible for many years to come to survey the working population of this country even once, let alone periodically every six months.

Apart from the futility of the scheme, the expenses in material and working hours, the amount of energy and skill employed, are utterly out of proportion to the poor return—an average of 0·4% of active pulmonary tuberculosis and a very small percentage of other chest diseases, a good deal of which could and should be discovered by ordinary routine examination under an adequate and up-to-date diagnostic service.

A wave of positive criticism against the official scheme is rising. Heaf (1946) and Jessel (1945) state frankly the impracticability of surveys of a whole population. Jessel (1945) and Hoyle (1945) emphasise the potential danger of one normal radiological report in creating a sense of security which may delay diagnosis later. I have already drawn attention to this point (Hoffstaedt 1944). Hoyle concludes: "We have yet to learn how best it may be used and what the unavoidable limitations are of a method capable at once of revealing pulmonary tuberculosis at its most amenable phase and yet of failing to do so in practice, except for a fortunate few who happen to be in this phase at the precise moment of the examination."

Brailsford (1945) lucidly demonstrates the limitations of mass radiography and suggests the use of this method for limited, selected, and essential services. He, like England (1946), sees the danger of straining the dispensary system by overflooding it with insignificant cases to the detriment of those in need of attention and treatment. England's main criticism deals with the 25–50% leakage of the "drag-net" resulting from the voluntary character of the scheme, because it is the very fraction of the population most likely to show a high incidence of disease which will most probably escape the wide mesh of the net.

The wastefulness of routine mass radiography, if it ever attains its object of periodical surveys of stable population groups, is shown by Reid's (1943) revelation that the incidence of new cases of active pulmonary tuberculosis among the employees of the Metropolitan Life Insurance Co. dropped in ten years from 0·4% to 0·07%. This observation is supported by the report of the Medical Research Council (1945) that the incidence of newly discovered cases of active pulmonary tuberculosis dropped from 0·3% to 0·1% in a year when the same group was re-examined.

THE REMEDY

The diagnosis of disease is in the first instance the business of the family doctor. The general practitioner is not only just a clearing-station, but far more—the first line of defence. Before the practitioner can play his most important part in any health service which deserves the attribute "comprehensive and efficient," several basic conditions must be fulfilled.

The first essential condition is that "for diagnosis, doctor and patient must meet" (Trail 1942). As this cannot be taken for granted, something has to be done about it. It has been shown over and over again that too much time is lost before the patient sees the doctor (Mann 1943, 1946). Health education on a nation-wide scale, starting at school, must create and foster a sense of health responsibility, and at the same time the masses must be educated to look after themselves and to seek proper medical advice (not a bottle of medicine or pink tablets) in time. The modern tendency to spoon-feed the people weakens and eventually destroys the sense of self-responsibility and of independence which is the very essence of civic liberty. A wrong notion of what is meant by "guaranteed security" makes the people too much dependent on some sort of State assistance or public services which will take all the trouble and will

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readily come in whenever required—though then often too late.

It therefore seems that, except for certain hazardous industries where routine mass-radiography surveys are essential, it is a psychologically wrong approach, and not without danger, to bring the X-ray machine to the factory and to the office. The better plan would be to see that the really deserving people, the suspected cases, are sent to the X-ray department through the agency of their own doctor.

The widespread indolence and complacency of so many irresponsible and ignorant people must gradually but systematically be overcome. The raising of the school-leaving age is perhaps a unique opportunity for health education. The cinema should produce an equivalent to the B.B.C. talks of the Radio Doctor. There is plenty of scope for effective health propaganda. To maintain the proper doctor-patient relationship, which is the foundation of any satisfactory health service, people must be encouraged to see first of all their own doctor.

It is certainly commendable that mass-radiography units direct their activities towards people in whom the presence of a chest disease may be suspected; but it is definitely wrong for them to organise so-called open sessions and invite the public, by advertisements in local papers and transport, to attend these sessions. This is contrary to professional usage and does not fit in with the generally accepted practice of outpatient clinics and public-health clinics.

It is the general practitioner that must be encouraged, nay urged, to send patients for radiography. In the National Health Service the health centres, as they gradually come into being, will provide facilities for radiography. It is here that mobile mass-radiography units could be employed with the greatest benefit to the public (Hoffstaedt 1947). Adequately equipped health centres for group practice, taking the place of the often poorly equipped one-man shop called the surgery, will eventually give the practitioner the chance of examining patients properly. Here also basic laboratory facilities must be provided. Last but not least, the help of a trained nurse or of a receptionist will enable the practitioner to take proper case-histories, preferably on standard case-sheets with relevant anamnestic and symptomatic items, including family and occupational history. After all, history-taking is one of the most important and revealing parts of an adequate examination.

A much better training of the medical student in tuberculosis and chest diseases and in the appraisal of X-ray photographs is an urgent necessity. It must be understood by doctors that arguments about stethoscope versus X rays are pointless, because physical chest examination and radiography are not alternative but complementary methods, each of them indispensable and essential, supplementing, never substituting, each other. Maxwell (1946) rightly postulates: "A practitioner who did not insist on an X-ray examination of a suspicious chest case, especially after hæmoptysis, might be sued for negligence." And Toussaint and Pritchard (1944) logically visualise the same legal consequences for omission of a chest radiogram as those already existing under the present law for neglect to radiograph a bone injury in time. Even "the man in the street is coming to know that a chest examination without a film is of comparatively little value" (Tattersall 1946).

THE PLACE OF ROUTINE MASS RADIOGRAPHY

In existing circumstances the pursuance of the official scheme of indiscriminate routine mass radiography is utopian. The Medical Research Council (1942) rightly said that "owing to the limitation of apparatus likely to be available in this country concentration at the present time should be upon those groups where through the nature of employment (e.g., silicosis producing industries) or the composition of the population at risk a relatively high incidence of unsuspected pulmonary tuberculosis is likely to be found." Dick (1946), also recognising the continuing scarcity of machinery, allocates at least one afternoon each week to the examination of contacts and referred cases. Heaf (1946) and Brailsford (1944) recommend the use of the available units for those sections of the population where there is the highest risk: hazardous industries, contacts, and suspicious cases with symptoms. In hazardous industries mass radiography should also be used for pre-employment examination (Gooding 1946, Heaf 1946).

Routine periodical mass radiography of contacts would greatly contribute to the early diagnosis of pulmonary tuberculosis and at the same time help greatly the routine work of the chest clinics or dispensaries (Hoffstaedt 1944, England 1946). That the examination of contacts by mass radiography deserves first priority is clearly shown by the results published by Dick and Thompson (1946), who found the incidence of active pulmonary tuberculosis among contacts five times as high as in the general population; by Hahn (1943), who found similar figures among consorts of persons with pulmonary tuberculosis; and by Couts (1947), who found an incidence of 5·5% and 6·3% respectively among contacts examined in 1944 and 1945.

In short, it is the suspected rather than the unsuspected section of the population on which we have to concentrate our efforts to make radiography the most powerful weapon in our fight against the white plague.

SUMMARY

Of 23 adult male sanatorium patients who had been examined in the course of routine mass radiography, this procedure had been valueless in 10. Of the other 13, only 6 were diagnosed in an early stage.

Another group of 20 cases illustrates the need for much better training of medical students in tuberculosis and chest radiography.

The impracticability and undesirability of nation-wide routine periodical mass radiography are shown.

It is suggested that mobile mass-radiography units should be employed at health centres and should concentrate their attention on workers in hazardous industries, on contacts of known patients, and on suspicious cases with symptoms—i.e., the suspected rather than the unsuspected section of the population.

My thanks are due to Dr. J. W. Gray, medical superintendent, Holywood Hall Sanatorium, for permission to publish and for his kind and helpful advice.

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LOCAL EXECUTIVE COUNCILS

WE publish this week a further list of the chairmen and medical members of these councils. A council has still to be set up for the Scilly Isles. Earlier lists appeared in our issues of Sept. 6 (p. 364) and Sept. 27 (p. 485).

Anglesey

Colonel R. D. Briercliffe (chairman); Drs. T. A. Griffiths, Leslie Jones, R. O. Jones, J. Lloyd Lewis, W. Parry-Jones, N. B. Thomas, G. P. Williams.

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Wakefield

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Medicine and the Law

In the Wrong Carton

LAST week the Hammersmith coroner considered the case of a man of 42 who died suddenly after an injection for varicose veins.[1] The doctor who had been treating him said that the patient had previously had two injections. When he returned for a third injection the doctor drew off 2 ml. of 'Etalate' from an almost empty bottle. In order to make up the amount to 5 ml. he then took down from his cabinet a second bottle in a container labelled 'Etalate,' and withdrew from it a further 3 ml. In so doing, he saw only the rubber cap of the bottle, which remained in the container. The 5 ml. of fluid thus obtained was injected into the thigh of the patient, who collapsed and died two minutes later. Afterwards the doctor found that the second bottle contained adrenaline solution, not etalate. A fortnight earlier he had mislaid a bottle of adrenaline which he usually carried in his bag, and despite search it had not been found. Workmen were decorating his ground-floor room, and on the night before he saw the patient he had moved most of his equipment into a room on the first floor, where the injection was given. He concluded that the lost bottle of adrenaline must have found its way into the etalate carton.

A verdict of death by misadventure was returned.

1. *Evening Standard*, Dec. 15.

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In England Now

A Running Commentary by Peripatetic Correspondents

As soon as Siva appears on the scene, at the Indian Exhibition,[1] stone and bronze begin to dance; they can hardly do less, for he is the Lord of the Dance, the emblem of cosmic rhythm. Symbolic additional arms, weaving into the light-hearted pattern, astound the unaccustomed eye only for a moment; and gods and godlings crowd together, supple as van Gogh's fir tree, until every group seems rustling with movement, or rushing up in flame. How strangely quiet, after this, are the rooms of little brilliant pictures, where flowers enamel the ground and a blue Krishna sports with the milkmaids. They are as bright and vivid as pictures in a missal—

> . . . "Where all is smaller than a wren,
> But has high towers, meteors, and men,
> And suns and spouting whales."

Whales, indeed, are not to be seen, but there are fawns and hounds and horses, and a Persian richness of flowers and trees and shining silks.

* * *

An exhumation I attended a few weeks ago was almost a jolly occasion. Our proceedings started with an excellent cup of coffee and a welcoming smile from a Sister of Charity dressed in flowing black except for her white wimple and a large dangling wooden rosary at her waist. Two of my colleagues were also present—the local medical officer of health, bearing a Home Office exhumation order, and a physician from a neighbouring town, who, like myself, had consented to act as an official medical witness. The morning sun shone into the anteroom while we speculated quietly about our part in the coming ceremony, which had just begun with the chanting of the *Veni Creator* in the adjacent chapel.

Fifty years ago the foundress of the Order, after a saintly life, had died and been interred in a lead coffin in a deep vault beneath the wooden floor of the little church. Convinced of her outstanding sanctity, the community had applied to the Holy See for official inquiries to be made, hoping that these would lead to her beatification. I don't know much about the details except that these inquiries are thorough beyond belief.

First you dig up the body. This had just been done by a small group of blue-overalled workmen, who had torn up the floor, opened the vault, and raised a grimy leaden shell up to floor level and left it by the side of the hole. Seated on a chair in the middle of the little nave was the Reverend Abbot of an adjacent monastery with three or four monks in Benedictine habits, one of whom was the postulator, pressing the cause and acting as master of ceremonies for the occasion. Along one side of the chapel sat a line of nuns of the Order, all Reverend Mothers of branches of the community, some of whom had come half-way across the world to be present. We were given seats opposite the sisters, about three feet from the coffin, around which stood the six workmen. A long trestle table with a heap of rosaries and sacred emblems at one end took up much of the space, and in the background the good nuns had thoughtfully provided several hand basins, hot water, and a large bottle of 'Dettol.'

The Abbot rose and held up a document from the ecclesiastical authorities, the large stone of his finger ring making a touch of colour against the sombre black of his companions. The paper was read, authorising the exhumation and examination of the body, provided that no other bodies were disturbed and that all the process should conform with the laws of the civil authority. Here he turned to the M.O.H. and asked if all was in order to proceed. Receiving an affirmative answer Holy Church got down to serious business. One by one, with their right hands touching a large copy of the Gospels placed in the foreground, the small group of priests bound themselves by a formidable and comprehensive oath to give nothing but true and honest testimony of all that should be seen or found. Then two sisters from the end of the line came forward to be sworn and questioned by the Abbot. They agreed that they had witnessed the interment and that to the best of their knowledge the body had lain there undisturbed for fifty years. Then the chaplain pronounced the solemn curse of excommunication on any person who should, from whatever pious motive, disturb, add to, or remove anything from the coffin about to be opened. Lastly every one of the workmen and we ourselves were sworn in like manner. By this time I felt rather like the Jackdaw of Rheims; and we all know what happened to him.

The foreman of the attendants began work on the shell, introducing the point of a clasp knife into the edge of the lead lid and gently tapping the blade along the whole length of the side to work his way round to the starting-point. He was followed by two of his mates with screwdrivers who gently levered up the small nails securing the lead edges to the wood. The air of expectancy throughout the assembly could almost be felt.

The Roman Catholic Church is not easily persuaded to make new Saints, and first demands overwhelming evidence of their sanctity. I believe that among other things at least two major miracles connected with the Saint must be cited, and the evidence must be faultless and convincing. Later a very sceptical gentleman is briefed as Devil's Advocate and instructed to tear the evidence to shreds. Complete absence of corruption many years after death (embalming and the like being excluded) is a good start, and no doubt many hopeful hearts awaited something of the kind here. It has apparently occurred a good many times in the past. Still we, as doctors and medical sceptics (not to mention our oaths), had no intention of being deceived in any matters to come.

At last the outer lid was prized up and the inner wooden shell revealed with a damp white mould streaking its outer surface. The workmen gently lifted the heavy lid and laid it aside while the foreman easily levered up the light covering of the inner shell lying in a set of grooves. As witnesses we then rose to examine the contents.

Clothed in her black habit and scapular, a small body lay supine, the hands clasping a rosary and a withered spray of flowers, with a faded piece of paper, almost completely decomposed but bearing the faint handwriting of her solemn vows made a hundred years before, between her fingers. From some fault in sealing at the time of burial the coffin was not entirely airtight, and we found the body and outer clothes sodden with moisture. The lining of the shell, the outer clothing, and even the black felt slippers were intact, but the stockings and body covering had almost entirely rotted away. As a whole the body and limbs had retained their normal shape, but the tissues covered by clothes had become converted into adipocere of a white and almost granular consistency. The uncovered face and hands were shrunken and mummified to a brown colour, with the features unrecognisable but the finger-nails intact, though they became detached at a gentle touch.

The quiet voice of the postulator adjured us to make as thorough an examination as possible and to give an exact account of the condition of the body and all the limbs. I called to two of the sisters to free the heavy leather girdle and expose the rest of the body so that I could examine it while my physician colleague took notes. Then we adjourned to the trestle table to wash our hands. A nun found us a typewriter and carbon papers, and my colleague and I composed a joint report under the scrutiny of the M.O.H.

Meanwhile, the long file of nuns passed round the shell to take a last look at their foundress and to touch the exposed body with rosaries and crucifixes. The Abbot and his attendant clergy sat and watched the opened coffin till, after a formal question as to whether we wished to make any further examination, the order was given to reseal the leaden lid. We read, checked, and signed four copies of our detailed report and handed them to the postulator, who thanked us heartily for our help and then casually asked us if we had noticed anything unusual about the body, having regard to all the circumstances. We could only find him one sentence in our report which said: "There was a remarkable absence of odour when the coffin lid was raised." And

1. The "Exhibition of Art, chiefly from the Dominions of India and Pakistan" at the Royal Academy of Arts is open until Feb. 29, 1948; weekdays 10 A.M. to 7 P.M., Sundays 2–7 P.M.

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that, with the body a mass of adipocere, dripping wet clothes, and obvious access to moulds, we both thought at least slightly unusual.

* * *

It was somewhat of a shock, though a pleasant one, to change from our austere British food to the full, nay surplus, diet of America. At first I ate freely and put on 7 lb., but I soon found that I had to limit my intake if I wished to feel at my best. One's constitution undoubtedly accommodates itself to austerity.

Two points about the meals struck me as noteworthy —the constant presence of iced water and the usual absence of wine at table. The glass of iced water is served to each guest at every meal—breakfast, lunch, tea, dinner—before anything else is brought. After a time one gets to like it, though it does seem out of place when brought with a pot of hot tea. Once when I asked my hostess why it was always served she answered, "Well, we should not consider the table properly laid unless each person had it." Whether it is a good or bad thing for the stomach is not for me to say; an experienced physician thought it was harmful, but this may have been a case of sour grapes. It is the custom to drink cocktails—definitely in the plural—before the meal; but as a rule water, iced of course, was the only drink during the meal. Since I happen to be a teetotaller this was quite convenient.

* * *

Once upon a time, as you will remember, there was a princess who had stepmother trouble. Her eleven brothers were turned into swans and she got carried off and married to a king. She used to leave his bed (it says that in the book) to collect nettles from the churchyard and to weave them into coats of mail, specific cures for those who are swans by day. She was about to be burned as a witch when it all came right, all but the eleventh brother's arm which remained a wing. You remember? Hans Andersen assures us that the diagnosis of being a witch rested on her refusal to speak and her going to the churchyard; but I doubt if he got the case-history right. How was he to know about Feldberg, Anrep, and their colleagues?[1] It is only too obvious now. The woman was pregnant, the nettles planned to do their stuff with acetylcholine, histamine, and something, but she had a high histaminolytic index and so although she felt the pain she didn't get nettle-rash. That's why they thought she was a witch; probably Andersen thought the churchyard story had better sales-value.

It has taken me forty years to make the diagnosis of pregnancy in this case. Is that in time for those who live happily ever after?

* * *

She was one of the cases in which the formidable battery of psycho- and physico-therapies of modern psychiatry had failed. Over the weekend at home she smashed all her crockery and put most of her clothes into the fire. Then somebody remembered that a gynæcologist had suspected gland trouble because of the faun-like hirsutes she had from the belt downwards. The big gun of endocrinology was to come up all the way from London and matron was told to get the patient prepared for examination. After the experts had put their heads together and the gynæcologist had pleaded his case for virilism, we stood around the bed to see the evidence. I wish I could describe his face (and ours) when it was found completely removed, shaved off by our well-trained and zealous matron.

* * *

My peripatetic friend has suggested (Dec. 13) that the surest way to avoid seasickness is to put one eye into retirement. My family has strong Nelsonian traditions, and we have always understood that that great sailor suffered all his life from this distressing disturbance. Does anyone know whether it was less prominent after he lost an eye off Corsica in 1794? But I don't suppose he thought of blocking the contralateral ear, as my colleague recommends. Talking of Nelson, your readers might like to know my personal preference in remedies: I take three grains of phenobarbitone, wrap myself in a blanket, lie down, block both ears, close both eyes, and will the vessel to founder.

1. See *J. Physiol.* Oct. 15.

Letters to the Editor

PATHOLOGY IN THE NATIONAL HEALTH SERVICE

SIR,—Since its foundation twenty-one years ago the Association of Clinical Pathologists has kept a close watch on the development of the nation's service in clinical pathology, and it may claim to have played some part in shaping it. As officers of the association we should like to assure Dr. Coghill, Dr. Spence, and Mr. Stern that there is no project on the part of anyone to organise "hospital pathology separately from the rest of the professional hospital services." Such a step would, as they rightly point out, inevitably divorce clinical medicine from pathology; and it would be directly contrary to the policy of our association which would have offered to it the most vigorous opposition: fortunately we know that no separation of clinical (which includes hospital) pathology from clinical medicine is in contemplation. We are satisfied that the service in clinical pathology will be developed "as an integral part" of the national hospital service, and further that it will be so developed in close consultation with the pathologists concerned.

So far as hospital pathology is concerned Dr. Coghill and his associates are barking up the wrong tree.

S. C. DYKE
Chairman of Council.
W. H. MCMENEMEY
Secretary, Association of Clinical Pathologists.

HYPERTENSION AND HEREDITY

SIR,—Your interesting annotation of Dec. 6 prompts me to add a few historical facts. The conception of hypertension as a hereditary disease is old. Seventy years ago—that is in the decade preceding von Basch's (1887) introduction of his sphygmomanometer into clinical use—Broadbent, and later Huchard,[1] who was the first to differentiate between two distinct types of hypertension which he termed *artériosclèreux blancs* and *artério-scléreux rouges*, mentioned heredity as the most important ætiological factor. J. Pal (1905) in his *Gefässkrisen* considered hypertension as a "family disease." Alvarez [2] and Vaquez and Leconte [3] took the same view, and Volhard who stressed the point in a paper published by his co-worker John (1913) used—as I well remember from the time I was his assistant in the early 'twenties—to teach his students that it is up to the family doctor to fill the gap in our knowledge about the ætiology of essential hypertension.

Genealogical charts can be traced back to 1899, when Pel [4] published a table of four generations with "chronic nephritis"; this was reproduced in Volhard's monograph [5] which contains family trees covering four generations and gives blood-pressure readings for the last two. Statistical data were given by O'Hare, Walker, and Vickers,[6] who examined the family history of 300 cases of hypertension, with a positive history of vascular disease in 68%, and by Wiechmann and Paal,[7] who in 500 cases found such a history in 38%. But these and other statistics based on circumstantial evidence are not conclusive, since cerebral hæmorrhage and coronary thrombosis are not necessarily connected with high blood-pressure.

There is, however, another more conclusive way to prove the constitutional nature of essential hypertension. In an investigation of the prehypertensive age of descendants of patients with essential hypertension, I frequently found [8] in blood-pressure curves recorded at intervals of under 1 minute up to 1 hour the same huge range of oscillations of the systolic blood-pressure which is

1. Huchard, H. Traité clinique des maladies du cœur, Paris, 1899, vol. I, p. 51.
2. Alvarez, W. C. *Arch. intern. Med.* 1920, **26**, 381.
3. Cited by L. Pellissier, L'hypertension artérielle solitaire, Paris, 1927, p. 97.
4. Pel, P. K. *Z. klin. Med.* 1899, **38**, 127.
5. Volhard, F. Mohr-Stähelin's Handbuch inneren Medizin, Berlin, 1931, vol. VI, p. 1637.
6. O'Hare, J. P., Walker, W. G., Vickers, M. C. *J. Amer. med. Ass.* 1924, **83**, 27.
7. Wiechmann, E., Paal, H. *Dtsch. Arch. klin. Med.* 1927, **154**, 287.
8. Hahn, L. *Zbl. inn. Med.* 1924, no. 46, p. 946; *Ibid*, 1925, no. 1, p. 1; no. 32, p. 738.

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characteristic of the first stage of essential hypertension, then termed by me "chronic intermittent hypertension." These oscillations occur quite independently of the absolute height of the systolic blood-pressure and are present even if symptoms of angioneurosis—the equivalent of essential hypertension in the young—are slight or absent.

Nuneaton. L. HAHN.

TEACHING APPOINTMENTS

SIR,—Dr. Black (Dec. 6) has completely missed the main point of my letter on Nov. 22. I had no desire to belittle the contribution to medicine of laboratory research-workers. The issue is an entirely different one. It is that people who have achieved success as laboratory workers, but who have had extremely little clinical experience, are being given appointments as teachers of clinical medicine. In my opinion—and I am supported by many others—this is wrong, because it is unfair both to clinicians, who have spent years improving their clinical knowledge, and to the great bulk of students.

The position has arisen in large measure from the fact that in the past research-workers were underpaid. With more money, but not enough to employ as teachers both trained clinicians and laboratory research-workers, many of the universities have appointed the latter as more likely to bring fame and honour to the schools; so we may see a university appoint a biochemist as a professor of clinical medicine, and a bacteriologist as the senior lecturer. I feel sure that if that great teacher and clinician, William Osler, were alive and were to apply for the post of senior lecturer in clinical medicine, he would at many schools be turned down in favour of a young fellow who has published some papers on the aluminium content of fluids removed from the nuciform sac.

I am not asking, as Dr. Black suggests, university authorities "to dismiss research ability from their consideration in appointing senior staff." What I am asking is that when they appoint professors and senior lecturers in clinical medicine, clinical experience and ability and an aptitude for teaching, should be the major considerations.

That distinguished teacher and clinician, Dr. F. M. R. Walshe, in his recent address to medical students (*Lancet*, Dec. 6, p. 817), has answered the points raised by Dr. Black. The objects of a teaching hospital are, says Walshe, "to advance knowledge, to train doctors, and to set an example of practice." Further, he points out, clinicians as well as laboratory workers have contributed to this advancement. Doctors cannot "set an example of practice" if they themselves are not good clinicians; and good clinicians are not made in the laboratory. M.R.C.P.

COAGULATION FACTORS

SIR,—I cannot quite agree with Professor Seegers (Nov. 1), who, holding "your leading article on Sept. 13 to be misleading and inaccurate," says: "The account given above records who established these facts."

As I pointed out in my letter earlier this year (June 7), it was Dr. Owren who first proved definitely the existence of at least one more coagulation factor. This factor V, as Owren calls it, is different from prothrombin but absolutely necessary for the conversion of this substance to thrombin by thromboplastin and calcium. This discovery was made in 1943, and a preliminary report of the isolation and properties of the new factor was read before the meeting of the Norwegian Academy of Science in Oslo on Nov. 10, 1944.[1] In this connexion I would recall that Norway at that time was still under German occupation, and that Dr. Owren therefore had no opportunity to publish his findings in an international journal to which other workers in this field had access. Conditions in Norway during and immediately after the war are also to be blamed for the delayed publication of Owren's monograph on the subject, which appeared in 1947.[2] On the other hand, many of the British and American journals were not available in Norway for a long time. Thus, the paper of Professor Quick on prothrombin A and B, published in 1943,[3] did not reach Norway until last year.

What I want to make clear is that the work of Owren has been carried out quite independently, and that it is not, as one might believe on reading Professor Seegers's letter, a mere confirmation of the findings of other investigators. The paper of Fantl and Nance [4] was published at a time when Dr. Owren had given a series of lectures about his factor V in Norway,[5] Denmark,[6] and Sweden[7]; and a few days after its appearance he also lectured in London [8] and Oxford.[9]

The work of Owren brings for the first time into harmony several of the earlier contradictory observations, by showing that the "pure" preparations of coagulation factors used by previous investigators were all contaminated with factor V to a greater or less extent. Factor V is not an accelerator in the strict sense of the word, but a true coagulation factor, for no coagulation takes place (in vitro) in the absence of factor V. Whether factor V itself is able to bring about the transformation of prothrombin into thrombin through the action of thromboplastin and calcium, or whether, as Owren thinks, it first has to be converted into factor VI, which then would be the real coagulation factor, remains an open question. As far as I can see, the prothrombin B of Quick [3] is identical with what Seegers and Owren more correctly call prothrombin, while prothrombin A and the accelerator substance of Fantl and Nance and of Ware, Guest, and Seegers [10] is identical with factor V.

I hope that these remarks may help to remove some of the mist that seems to make it difficult to discover "who established these facts."

Central Laboratory, Aker Municipal Hospital, Oslo, Norway. KARL CLOSS.

BREACH OF CONFIDENCE?

SIR,—I cannot help thinking that the profession is unaware in how many ways breach of medical traditions is occasioned by the procedure adopted by the Ministry of Food in enlisting the support of their so-called "medical advisers" to override medical certificates which medical practitioners are required to send to the Ministry of Food when requesting allowance of special invalid diets. The procedure was described very fully in an important debate (*Hansard*, Jan. 22, 1947), and it was condemned from all parts of the House.

The doctor is required to submit a medical certificate, describing in great detail the character and prognosis of the illness for which concession is asked. Unless the illness fits into a schedule of diseases furnished by the medical advisers as automatically deserving priorities—in which case the concession is automatically made—the Minister of Food's clerks, on their own responsibility, select that one of the medical advisers whom they consider proper to approach in the case. If such a position arises, a bunch of civil servants, with no medical knowledge or experience, presume to sit in judgment upon certificates furnished by registered medical practitioners in actual charge of the patients concerned, and these certificates may be overruled by some unnamed medical practitioner who has had no contact with the patient, who may have had no experience of the specific illness, and who certainly has no knowledge whatever of the individual circumstances of the case.

I submit, Sir, that this procedure involves the negation of well-established rules of professional conduct, some based on immemorial sanctions.

1. A medical certificate, which should enjoy the fullest protection of professional secrecy, is submitted without the authority of the patient to lay inspection, which may in certain circumstances involve publication even more wide than that of the Ministry's clerks. I have before me a letter from a distinguished medical practitioner, who found that

1. Owren, P. A. Aarbok for Det Norske Videnskapsakademi, 1944, p. 21.
2. Owren, P. A. Coagulation of Blood: Investigations on a New Clotting Factor. *Acta med. scand.* 1947, suppl. 194.
3. Quick, A. J. *Amer. J. Physiol.* 1943, **140**, 212.
4. Fantl, P., Nance, M. *Nature, Lond.* 1946, **158**, 708.
5. Meeting of Norw. Acad. Sci., Oslo, Nov. 10, 1944; Norw. Med. Soc., Oslo, June 6, 1945; Med. Physiol. Ass., Oslo, Nov. 1, 1945.
6. Meeting of Jutland Med. Soc., Aarhus, April 28, 1946.
7. Scand. Congr. Int. Med., Gothenburg, June 28, 1946.
8. London Univ., Nov. 22, 1946.
9. Radcliffe Infirmary, Oxford, Nov. 28, 1946.
10. Ware, A. G., Guest, M. M., Seegers, W. H. *J. biol. Chem.* 1947, **169**, 231; *Science*, 1947, **106**, 41.

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his certificate, sent to the Minister, in which he had expressed the opinion that the patient would probably die had been communicated to a food office in the district where the practitioner practised, and he learned that certain district nurses were discussing the probability of this patient's death, having obtained this information via the local food office. At the recent session of the General Medical Council the chief medical officer to an Irish insurance company was adjudged "guilty of infamous conduct in a professional respect" for having sought from a registered medical practitioner information regarding his patient, who had not authorised such disclosure. The chairman, in giving judgment, said that the Council "took a very serious view of any action which might impair the patient's trust in the confidential nature of any information obtained by a medical attendant about his patient."

2. The medical advisers, or some of them, are offending against the salutary rule that a medical certificate should not be given without proper medical examination of the patient immediately prior to the issue of the certificate. When the General Medical Council met last month a medical practitioner was severely censured, and narrowly escaped removal of his name from the Register, because he had given certificates which sought out of compassion to prolong for a short time the leave of a serving soldier whose father had been under the practitioner's medical care two or three weeks previously, but not immediately before the certificates were issued. These certificates declared that the father was ill enough to require his son's aid.

3. Modern medicine deprecates a philosophy which regards diseases as entities. The wiser conception is surely that of a sick person who shows symptoms which, for convenience, may be grouped as a syndrome, but exhibiting individual differences which require individual treatment. It is the flouting of such a conception which fosters the wicked racketeering by the patent-medicine trade, with its lists of diseases, each calling for such-and-such a nostrum.

I submit that it is in the highest degree regrettable that the "medical advisers" who enjoy the prestige of membership of the Medical Research Council should lend their support to practices so repugnant to medical science and to medical ethics.

House of Commons. E. GRAHAM-LITTLE.

A SIMPLIFIED ANATOMICAL NOMENCLATURE

SIR,—Some day within the next decade or two the medical course will have to be extended considerably unless the annual growth of the syllabus is curtailed. There is one sphere in which this could be done without loss and even with profit—namely, anatomy. For instance, the index of *Gray's Anatomy* lists about 380 named arteries and a corresponding number of veins. I wish to put forward a scheme for reducing this number considerably while at the same time making it easier to picture the course of a vessel in relation to the whole body.

The adult arterial system consists essentially of a dorsal aorta with a bifurcation at each end. Let us term the two cranial branches *directly* the right and left subclavians, and let us say that they extend down to the elbow, having passed through the axillary fossa and curved round to the front of the arm when the palm is uppermost. At the lower border of the elbow-joint they bifurcate to give us the anterior and posterior subclavian branches, while from the posterior branch just after its origin there arises the anterior interosseous which in turn gives off the posterior interosseous. The anterior subclavian continues down to supply the thumb and by the palmar ramification an anastomosis is formed between anterior and posterior subclavians. That is a comprehensive and easily retained picture; the subclavian arising from the aortic arch and reaching to the finger tips.

Similarly the caudal fork can be dealt with. To correspond as closely as possible with the upper part of the body let us call the single vessel that reaches from the fourth lumbar vertebra to the back of the knee the femoral artery. Then the aorta divides into the right and left femoral arteries from which are given off the right and left iliacs. The femorals pass down through the femoral triangle and run down in an elongated spiral, medially directed, to reach the popliteal fossa at the back of the knee-joint, after which they divide into anterior and posterior branches, the posterior in turn giving off the peroneal. At the foot the posterior branch divides into lateral and medial plantar, ramifying round the toes where an anastomosis is effected with the arcuate ramification of the anterior femoral artery.

Admittedly this is only the barest outline, and an extensive filling-in is needed; but, even so, a person with no special knowledge of anatomy could draw an accurate diagram of the major vessels as the description was read to him. The same treatment can be applied to many of the branch arteries. Why, for instance, complicate the internal iliac by naming its divisions anterior and posterior rami which become the inferior and superior gluteal? Why not call them by the name gluteal at once?

Surely the very naming of an artery "innominate" shows that the nomenclature had defeat within itself, even while developing towards its present complexity.

Trinity College, Dublin. MICHAEL DILLON.

*** Anatomical nomenclature badly needs simplifying, and our correspondent's proposals are attractive. But extending names to cover such long tracts of vessels and nerves would make it difficult to specify particular parts of the tracts. It would also create confusion for comparative anatomists unless it were applied throughout the vertebrate phylum.—ED. L.

DIABETIC ARTHROPATHY

SIR,—In his letter of Nov. 15 Dr. Shore described a Charcot knee-joint in a diabetic. Several similar cases have recently been reported, but in most of these the ankle-joint was affected. Rundles [1] describes one case with extensive disruption of the tarsometatarsal joint, with loss of joint surfaces and many loose bodies. Fourteen diabetic cases seen at the New England Deaconess Hospital had suffered painless destruction of joints of the tarsus during the previous few years [2]; and Jordan [3] gives details of a woman with diabetes of 14 years' duration who developed a typical painless Charcot joint of the ankle, in addition to chronic osteomyelitis of the foot of an unusual type and without obvious ætiology. Later he [4] reported two further cases of diabetes—one with a neuropathic ankle-joint, and the other with changes in the lumbar vertebræ. As Dr. Shore mentioned, Foster and Bassett [5] have published the histories of two cases of severe, poorly regulated diabetes in young men, complicated by a Charcot ankle-joint.

The following case at present under observation in our diabetic clinic seems worth describing.

A clerk, aged 62, was first seen in January, 1939, with a four weeks' history of thirst, polyuria, and loss of weight. At that time no abnormal signs were discovered in the central nervous system; he was treated by diet alone, and his symptoms rapidly subsided. When complaining of chronic pains in his limbs in June, 1942, the knee and ankle jerks were found to be absent, and treatment with insulin was started. About a year later, because of diarrhœa the dose of insulin had to be reduced. In November, 1943, he developed acute iridocyclitis, and in 1944 he was treated for trophic ulcerations on the right leg; there were then signs of peripheral neuritis; the Wassermann reaction (W.R.) was negative. During 1945 he complained of giddiness and deafness and was found at times to have a fine nystagmus which, it was suggested after full examination, was due to toxic neuritis of the right auditory nerve. The blood W.R. was again negative. The cerebrospinal fluid (C.S.F.) contained no cells and 50 mg. of protein per 100 ml.; the test for excess globulin was negative as was the W.R.

In October, 1946, without antecedent trauma, the patient suddenly began to have severe pain in his left knee which was swollen and hot, though only osteoarthritis with some osteoporosis was revealed by radiography. Two months later, however, further X-ray films showed a pathological fracture at the upper and inner border of the left tibia, with marked bone sclerosis and new bone formation. Although then

1. Rundles, R. W. *Medicine, Baltimore*, 1945, **24**, 111.
2. Bailey, C. C., Root, H. F. *J. clin. Invest.* 1942, **21**, 649.
3. Jordan, W. R. *Arch. intern. Med.* 1936, **57**, 307.
4. Jordan, W. R. *Sth. med. J.* 1943, **36**, 45.
5. Foster, D. B., Bassett, R. C. *Arch. Neurol. Psychiat.* 1947, **57**, 173.

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tender, the joint has since become painless, but has remained grossly swollen; and it is now completely disorganised. Full examination at that time revealed small irregular pupils irresponsive to light and convergence; almost complete loss of vision due to bilateral cataracts; loss of all tendon-reflexes but brisk abdominal reflexes; and diminished cutaneous sensibility in "glove-and-stocking" areas. Ataxia and incoördination were not pronounced; there was generalised muscular wasting of the legs with loss of power, but no gross hypotonia or muscle tenderness. The C.S.F. examination was repeated with a similar result except that the globulin reaction was positive; but the colloidal-gold curve was 0000000000. The W.R. was again negative in both blood and C.S.F.

It has been suggested that this in fact is a case of tabes dorsalis complicated by diabetes; but the loss of pupil reaction can be explained on the history of diabetic iritis and keratitis, and in the absence of historical, clinical, or serological evidence of syphilis, a diagnosis of diabetic arthropathy appears justifiable.

My thanks are due to Dr. H. K. Goadby, who is in charge of St. Thomas's Hospital diabetic clinic, for permission to publish the above case.

St. Thomas's Hospital, London, S.E.1. G. E. SPEAR
Medical Registrar.

PENICILLIN BY MOUTH

SIR,—I read with great interest the excellent article by Dr. Stewart and Dr. May in the issue of Dec. 13. This investigation has been wanted ever since the introduction of penicillin therapy. I wish to add a rather modest contribution to their findings.

I have used penicillin by mouth for the last twelve months in chronic wards. I was prompted to oral administration of penicillin by: (1) the natural aversion of elderly patients to needling; (2) the effectiveness of this route in children; and (3) American publications. I have used it in various conditions such as urinary infections, respiratory infections, bedsores, and skin infections; at first I was surprised by its beneficial effect but later was surprised if it failed. I ascribed the failures to penicillin-insensitive organisms and to the feeble circulation in greatly debilitated chronically ill or very old people. No doubt some of my failures must have been "poor absorbers"; and possibly the dosage was inadequate.

I gave 500,000 units twice daily: the first dose approximately two hours after breakfast, and the second two hours after tea. I used both yellow and white penicillin diluted in 10 ml. of distilled water. The complications I met were stomatitis during penicillin treatment in 2 cases, and in 1 case an urticarial rash with giant weals ten days after cessation of treatment. However, this last patient was treated concurrently with sulphadiazine, and one and three days before the appearance of the rash he had two sittings of ultraviolet-light treatment. Thus, I rather hesitate to blame the penicillin for the rash.

Joyce Green Hospital, Dartford. E. GANCZ.

VIABILITY OF TREPONEMA PALLIDUM

SIR,—Readers of Dr. Lumsden's article on the above subject, in your issue of Dec. 6, may be interested in an experiment which I carried out in 1933, in collaboration with Dr. McNabb, Dr. Matthews, and Dr. McClure of the Toronto Public Health Laboratory. This was reported in the *Bulletin of Hygiene* [1] (in reviewing a paper by these authors [2] on a combined outfit for collection, in capillary tubes, of specimens in the field); it was also mentioned in a letter to THE LANCET.[3] Briefly, the Canadian workers sent me six outfits for collection of specimens for dark-ground examination, and these were filled in the V.D. department, St. Thomas's Hospital. On arrival in Toronto, the contained specimens of *Treponema pallidum* were found to be still motile. Three of the tubes were returned to me with another collected in Toronto. The contained *T. pallida* were still motile, and the preparations of them, each now between slide and cover-slip luted with wax, were returned to Toronto. They were reported to be still motile there and were returned to me. In London motility continued for four days after receipt. Thus three of the specimens crossed the Atlantic four times and the fourth three times: the intervals from the taking of the specimens to final disappearance of motility were, 84, 75, 72, and 50 days. The persistence of motility after the third journey was confirmed by the Toronto workers and after the fourth by those in my clinic.

London, S.W.1. L. W. HARRISON.

1. 1934, 9, 125.
2. McNabb, A. L., Matthews, G., McClure, A. D. *Canad. Publ. Hlth J.* 1933, 24, 405.
3. Harrison, L. W. *Lancet*, 1934, i, 156.

BLOOD SAMPLES FROM INFANTS

SIR,—Blood may be collected from infants under 12–18 months of age from the anterior fontanelle, the heel, the jugular vein, or the great toe. To obtain 5–10 c.cm for serological tests is not always as easy as in an adult. Recently I had occasion to take samples from a series of 150 infants and found the great toe a convenient site to use.

The patient's right leg (if the doctor is right-handed) is bathed for ten minutes in warm water; it is dried and a crêpe bandage firmly applied from the ankle to above the knee. The nurse then holds the baby so that its right foot rests between the operator's knees, while the foot, after sterilisation with methylated ether, is firmly grasped in the left hand and the great toe steadied. Using a Graefe's cataract knife, an incision about $^1/_8$ in. long and $^1/_{10}$ in. deep is made on the internal aspect of the toe parallel with its long axis. The crêpe bandage is relaxed and the toe slowly rotated clockwise through an angle of 45° with a firm grip. The grip is then relaxed and the toe released. As this movement is repeated the incision automatically opens and a wave of blood flows down the inside of the foot and can be collected to the desired amount.

If the foot is held firmly and the incision made rapidly it is surprising how little evidence of pain is registered by the patient—little girls especially being apparently more curious than hurt by the whole procedure. When sufficient blood has been collected the flow is stopped by firm pressure with cotton wool for 30 sec. and a small elastic adhesive dressing applied immediately. This, in all cases, was sufficient to arrest the bleeding and secure healing by first intention.

Manchester. ANDREW V. MAGEE.

Parliament

FROM THE PRESS GALLERY

Medical Practitioners and Pharmacists Bill

ON Dec. 16 the House of Lords agreed to the Commons amendments to this Bill.

QUESTION TIME

Fowl Pest

Sir J. BARLOW asked the Minister of Agriculture how many cases of fowl pest there had been in each of the last six months; and what precautions were being taken to combat this disease.—Mr. T. WILLIAMS replied: The figures for June to November are 209, 112, 62, 145, 539, and 665 respectively. I have made an order prohibiting in certain circumstances the sale, movement, and gathering of live poultry in England and Wales. The importation of dead poultry from countries in which the disease exists is prohibited, and the importation of dead poultry from Europe is limited to eviscerated carcases. There has been some diminution in the spread of the disease since the beginning of this month—98 outbreaks were reported from Dec. 1 to 11, compared with 276 for the corresponding period in November.

Sir J. BARLOW: Is the Minister aware that certain expert opinion is that this disease is transmitted to poultry in the marrow of bones so that the importation of drawn poultry does not entirely meet the case?—Mr. WILLIAMS: We get all our advice from our experts and we act accordingly.

THE title and status of emeritus professor of medicine of the University of Athens has been awarded to Dr. A. P. Cawadias by royal Hellenic decree.

THE Royal Society has appointed Dr. G. S. Dawes, of Worcester College, Oxford, to a Foulerton research fellowship in medicine.

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Obituary

BERNARD SPILSBURY

KT., M.A., B.M. OXFD, F.R.C.P.

ENGLISH forensic medicine has lost a commanding figure in the death of Sir Bernard Spilsbury on Dec. 17 at the age of 70. For thirty years he had stood alone and unchallenged as our outstanding medicolegal expert, achieving both public and academic distinction and earning by his conscientious application and integrity the high regard of his own critical profession.

Educated at University College School, Manchester Grammar School, Magdalen College, Oxford, and St. Mary's Hospital, he was trained in bacteriological work as a member of Sir Almroth Wright's team at St. Mary's, but towards the end of King Edward VII's reign he set out on his career as a morbid anatomist and histologist, holding posts in these branches of medicine for many years at both St. Mary's and St. Bartholomew's Hospitals, and relinquishing them only because of increasingly heavy calls on his services as a forensic expert. He had a flair for simple exposition, and his painstaking search for evidence, together with his gift for evaluation and reasonable inference, quickly proved their usefulness to the police. To these basic qualities he added an honesty of purpose and a personal integrity that was never questioned: he provided a pillar of security in the medical evidence for Crown prosecutions in crime. Once Spilsbury had made up his mind he adhered to his views inflexibly, immune alike to assault and to the blandishments of flattery. He was indeed a master of the art of plain unvarnished reasoning, and both time and the circumstantial evidence bore out his soundness in case after case from the time of Crippen to that of the bandit murdering of Antiquis.

Topical Press Agency

He achieved in turn acknowledged leadership in his profession, academic lectureships, examinerships at Oxford and London, Home Office approval, a knighthood (in 1923), fellowship of the Royal College of Physicians, and presidency of the Medico-Legal Society—all with the same apparent imperturbability and the same secret pride, unaffected yet aware of his qualities of leadership in a previously unled profession. His natural reserve was never overcome and he remained humble with his own conscience, strange and unacceptable as this may seem to those who merely saw but did not know him. His assurance in the witness-box misled the public into the belief that he had become a witness for the prosecution; but there were occasions when his prescience dissipated suspicion and freed an innocent prisoner.

Spilsbury spent many hours and much tedious work in making up his mind: he wrote elaborate notes and longhand reports. But, despite his stubborn resistance to any effort to shake his belief in what he had determined was the truth, he remained impartial and scientifically reasonable, difficult to tilt, aloof and a little cold, but prepared to accept challenge even if he did not welcome it. No practitioner worked harder; he never failed to visit the scene of a crime, town or country, day or night, and never failed to be at hand at the trial, ready to accept reason or rebut the unacceptable. Fees were of no great importance to him, and indeed his disinterest in money limited both his leisure and his material relaxations. As a lecturer he shone less brilliantly, disliking routine teaching, writing but little and lecturing even less outside his three London school appointments—St. Thomas's, University College, and the Royal Free. Retiring and outwardly frigid, he disliked visits from strangers and seemed somewhat distant to casual professional acquaintances. In reality he was a lonely man, an idealist in plan, compromising in practice, relaxing little. He overtaxed his failing health and was sadly stricken by the loss of two of his three sons, fading finally to a figure which, though it never lost respect, became too frail for this hard world. He will remain a revered figure in medicine.

HAMISH FALCONER MASSON

M.A., M.B. EDIN., F.R.C.S.E.

Dr. H. F. Masson, who died on Dec. 7 at the age of 45, was the third son of the late George Masson, J.P., of Kingussie. He was educated at Fettes College and Edinburgh University, where he took a classical M.A. in 1932, and three years later his M.B. After holding house-appointments at Preston Royal Infirmary and Kettering General Hospital he took his F.R.C.S.E. in 1930. For a time he was in practice in Dingwall before settling in South Woodford, where he had practised for the last ten years.

"Hamish Masson," writes J. B. Y., "had intellectual gifts that could have carried him to a high place amongst consultants, but he preferred general practice with its more personal human contacts. His handsome appearance and attractive personality made him a conspicuous figure in any company, but no man so gifted was ever more unassuming, or more tolerant towards his fellow men. His work made great demands upon him, and he never spared himself. In the last year his health gave some grounds for anxiety, but the end, when it came, was unexpected."

Dr. Masson, who married only eighteen months ago, leaves his widow with a young son.

DOUGLAS ARTHUR CLOUSTON McRAE

M.B. EDIN., M.R.C.P.E.

Dr. D. A. C. McRae, director of the blood-transfusion services for South-east Scotland, who died recently in Edinburgh, graduated M.B. at Edinburgh in 1938. After qualifying he held house-appointments at the Edinburgh Royal Infirmary, where he later became clinical tutor. McRae was a former president of the Royal Medical Society, and one of his contemporaries writes: "He was the most brilliant man of his year, although no academic honours came his way as an undergraduate, for his intellectual energies were spent in many and diverse channels—the Bach Society and Palestrina Club were only two of his cultural activities. A man of infinite charm, he leaves nothing but pleasant memories for those who knew him well."

HENRY COOPER

D.S.O., M.A. CAMB., M.R.C.S.

Group-Captain Henry Cooper, who died on Dec. 13, was one of the pioneers who, at the end of the 1914–18 war, were responsible for the formation of the medical service of the Royal Air Force.

Born in 1877, the second son of John Spyvee Cooper, of Hull and Windermere, he was educated at Denstone College and Emmanuel College, Cambridge, where he took the natural sciences tripos in 1899. From Cambridge he went to the London Hospital, and after qualifying in 1904 he entered the Royal Navy. During his service in the Mediterranean he was present at the fall of Salonika, and he was in Constantinople during the Balkan war. In 1914–18 he served ashore in France and Belgium with the R.N.A.S. and armoured cars, receiving the D.S.O. and being appointed an officer of the Crown of Belgium for his distinguished and gallant conduct. With the formation of the Royal Air Force in 1918 he transferred to the new Service, and he was one of the small company under Sir Matthew Fell who started its medical branch. As may be imagined, this was a period bristling with difficulties, which provided wide opportunities for Cooper's organising abilities, inexhaustible tact, patience, and kindliness. On leaving the Air Ministry in the early days of the new Service he went to India as principal medical officer, R.A.F., whence he was posted to Iraq in a similar capacity, where he dealt competently with an epidemic of cholera. On his

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return to this country he was appointed P.M.O., Air Defences of Great Britain. From 1930 to 1932 he was honorary surgeon to the King.

After he retired in 1932, Cooper became clerk and registrar to the Society of Apothecaries, and the ancient hall of the society and its contents were a never-ending delight to his sense of history. When war broke out in 1939, though long past the age of recall, he volunteered for service and became P.M.O., Balloon Command, and from 1942 to 1945 he served at the Ministry of Health as assistant director of personnel in the E.M.S.

In 1906 he married Miss Grace Shone, who survives him with one daughter.

HERBERT THOMAS HERRING

O.B.E., M.B. DURH.

Dr. H. T. Herring, who died in London on Nov. 22, received his medical education at University College, London, and at Newcastle-on-Tyne. He took the Conjoint qualification and his M.B. Durh. in 1887 and he held a house-appointment at University College Hospital. Setting up in practice in Weymouth Street and later in Harley Street he followed Buckston Browne as assistant to Henry Thompson. At that time, before the advent of prostatectomy, the only method of relieving obstruction was by catheterisation, and as this had to be carried on indefinitely, asepsis was of vital importance. Herring devoted all his ingenuity to perfecting his technique, and was so successful that he was able to catheterise patients for years without producing cystitis. He published in both English and German his method of sterilising catheters, besides a considerable number of other communications based on a large urological experience. He was probably the last surgeon in this country to pass a catheter with the patient standing erect, his back pressed firmly against a velvet-covered area on the wall of the consulting-room. It is a method now forgotten, which is much simpler to use than one would imagine. The late Sir Peter Freyer once demonstrated it to an interested group at St. Peter's Hospital, and in his hands it seemed easy.

Through Sir Henry Thompson, Dr. Herring became interested in cremation, and served as honorary secretary of the Cremation Society, medical referee to the Woking crematorium, managing director of the Woking and Golders Green Crematoria, and honorary treasurer of the International Cremation Federation. In the later years of his life he set out daily from his home in Harley Street to the Cremation Society's offices in Baker Street, and in name and person he became well known to a large circle of doctors who sought the society's help.

THE LATE DR. BOLTON

Mr. F. J. M. Barrington writes: Though known best to most of his acquaintances as a physician of unusually sound judgment, the most remarkable feature of Charles Bolton's life was probably that he continued doing experimental research not only after he had a busy practice but even after he had retired from his hospital's staff. In fact he only stopped this when prevented by ill health. When he was director of the Graham research laboratories of University College Hospital medical school from 1908 to 1914, the people working there were nearly all trying to do something different, according to their interests, with the result that the possibility of any "direction" was slight. In spite of this he generally seemed to know what everyone was doing, and whether it was likely to lead to any good or not. A result of this circumstance was that he had more time for his own experiments, and in these years he probably did more than at any other time, chiefly on the production and absorption of lymph and on the healing of acute gastric ulcers. He was an exceptionally dextrous operator.

JAN MAZURKIEWICZ

Dr. J. Leyberg writes: Professor Mazurkiewicz, director of the psychiatric clinic at Warsaw University, died in Warsaw on Oct. 31. For many years president of the Polish Psychiatric Association, he was the most outstanding psychiatrist in the country. His organic approach to psychiatry was profoundly influenced by the writings of Pavlov, Sherrington, Adrian, and Hughlings Jackson, and his lectures enabled many Polish graduates to become acquainted with the British school of neurophysiology. During the German occupation he wrote a book on Evolution and Dissociation in the Central Nervous System, which is to appear shortly. His death will be sadly felt in Poland, particularly by those who had the privilege of working under his wise and friendly guidance.

Diary of the Week

DEC. 28 TO JAN. 3

Monday, 29th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. F. A. Williamson-Noble: Contact Lens.

Tuesday, 30th

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. A. G. Cross: Ocular Sequelæ of Head Injuries.

Wednesday, 31st

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. J. D. M. Cardell: Orthoptics.

Thursday, 1st

ROYAL COLLEGE OF SURGEONS
5 P.M. Dr. John Marshall: Ophthalmology in Relation to the Throat and Nose.

Friday, 2nd

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. L. H. Savin: Ptosis.

Births, Marriages, and Deaths

BIRTHS

BUKY.—On Dec. 15, in London, the wife of Dr. W. W. Buky—a son.
CORMAC.—On Dec. 6, at Stockport, the wife of Dr. C. D. Cormac—a daughter.
DORNHORST.—On Dec. 15, in London, the wife of Dr. A. C. Dornhorst—a daughter.
DOWLING.—On Dec. 15, in London, the wife of Dr. M. A. C. Dowling—a son.
GAULD.—On Dec. 14, in London, the wife of Dr. G. O. Gauld—a son.
KENIG.—On Dec. 11, in London, the wife of Dr. M. Kenig—a son.
KING.—On Nov. 10, at Klagenfurt, Austria, the wife of Lieut.-Colonel Cecil King, R.A.M.C.—a daughter.
LONGRIDGE.—On Dec. 12, at Salisbury, the wife of Dr. R. G. M. Longridge—a son.
MACKAY-DICK.—On Dec. 4, at Wuppertal, Germany, the wife of Lieut.-Colonel John Mackay-Dick, R.A.M.C.—a daughter.
MACKENZIE.—On Dec. 12, in London, the wife of Dr. A. G. Mackenzie—a daughter.
NIBLOCK.—On Dec. 7, at Peshawar, Pakistan, the wife of Major W. McN. Niblock, F.R.C.S.—a son.
PRICE.—On Dec. 10, to Dr. Celia Westropp and Francis Price—twin sons.
PRITCHARD.—On Dec. 14, at Chobham, Surrey, the wife of Dr. P. M. M. Pritchard—a daughter.
WATSON.—On Dec. 10, at Devizes, the wife of Dr. R. W. Watson—a son.
WHEATE.—On Dec. 10, in London, the wife of Dr. H. W. Wheate—a son.

MARRIAGES

MURPHIE—LINDOW.—On Nov. 29, in London, Charles Ian Murphie, B.M., to Elizabeth Anne Lindow.
STONE—SIMPSON.—On Dec. 13, in London, Patrick Stone, M.B., to Elisabeth Moone Simpson.
WOODYATT—PARBERY.—On Dec. 10, in London, Peter Bruce Woodyatt, M.R.C.S., to Elaine Joan Parbery.

DEATHS

COOPER.—On Dec. 13, in London, Henry Cooper, D.S.O., M.A. Camb., M.R.C.S., group-captain, R.A.F.
CURPHEY.—On Dec. 12, at Bath, Elizabeth Curphey, B.SC. Lond., M.R.C.S.
DOWLING.—On Dec. 15, at Preston, Lancs, Edward Dowling, B.A., M.D. R.U.I.
FINDLAY.—On Dec. 13, in Edinburgh, James Findlay, M.A., M.B. Glasg., lieut.-colonel, I.M.S. retd.
FREETH.—On Dec. 16, Arthur Causton Freeth, M.B. Durh., aged 57.
JOHNSTON.—On Dec. 15, at Prostatyn, Francis Johnston, M.B. Glasg., aged 89.
MILLIGAN.—On Dec. 11, at Guildford, James Knowles Milligan, M.R.C.S., aged 65.
SPILSBURY.—On Dec. 17, in London, Bernard Henry Spilsbury, Kt., M.A., B.M. Oxfd, F.R.C.P.
STEWART.—On Dec. 8, at Gerrards Cross, Bucks, Rothesay Charles Stewart, M.R.C.S.
WOOLLEY.—On Dec. 16, at Hove, Jasper Maxwell Woolley, M.D. Camb., D.P.H., lieut.-colonel, I.M.S. retd.

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Notes and News

THE TAVISTOCK CLINIC

LAST year the professional committee appointed to consider the rôle of the Tavistock Clinic in the post-war world, and the ways in which its work in social psychiatry might be extended, made two important decisions [1]—that the assets of the clinic should be spent on anticipated costs up to the day when it will be handed over to the Ministry under the National Health Service, and that the Institute of Human Relations should be legally separated from the clinic so that it may continue its independent work in fields not covered by the N.H.S.

The clinic and institute are organised on a practical plan: all members of the staff belong to work-groups known as units, with the coördination unit acting as a secretariat to the others. A senior member of the full-time staff, who is also on the professional committee, is responsible for one or more of these units, and these members also form the management committee of both clinic and institute. Each unit carries out projects in its own field but also contributes to training and research. At present, besides the coördination unit, there are an adult unit and a child-guidance unit. The adult unit offers to patients a consultation and counselling service, and a treatment service. Some patients require individual therapy for longer or shorter periods, but others can be helped considerably in group discussions.

The Institute of Human Relations, in a statement of aims and policy, is described as an attempt to develop a scientific institution equipped to respond to practical social demands such as problems of industrial morale, in new communities and in many aspects of education and family life. It undertakes work arising out of specific requests for help, and gives full technical collaboration to all concerned with a particular problem—assuming joint responsibility in working things out to a satisfactory finish, rather than giving an "expert opinion" and retiring from the field. Like the clinic, the institute is a federation of units, and these cover industrial projects, social and cultural projects, and educational projects; a fourth unit is responsible for publications, among which is a quarterly journal, *Human Relations*. The research programme includes accurate assessment of work done, and the development of new methods, especially with group technique and the study of "group dynamics." Group treatment of psychiatric patients, group discussion methods for education and training, and group techniques for such special purposes as leadership training and personnel selection are being studied. It is also hoped to develop new means of appraising personality and intelligence, and of treating speech disorders, and to study the causes, prevention, and treatment of delinquency.

WORK FOR THE BLIND

THE wide scope of the work of the National Institute for the Blind shows how much generous sympathy blindness excites, and to what practical use it can be put. The report for 1946–47 says that, besides an educational programme for children from birth to school-leaving age, the institute has two schools for adults—a school of physiotherapy and a school of telephony. At the school of physiotherapy, Great Portland Street, 40 students are in training, both blind civilians and ex-Service men and women, and there are increasing numbers of applications for places from the Dominions. During the year, 21 new trainees entered the school of telephony at Bridgnorth.

The Queen Elizabeth Homes of Recovery—America Lodge, Torquay, and Long Meadow at Goring-on-Thames—are centres for the training and reinstatement of the newly blind. Newcomers, removed from the fussy commiseration of relatives, find themselves among others who have mastered their disability. Their seemingly casual welcome is carefully planned, and they quickly find themselves sharing in a full and active life—learning Braille, Moon, and typing; trying their hands at woodwork and pottery; visiting cinema and theatre; taking part in dances and concerts; playing cards, draughts, chess, dominoes, and darts; bathing, rowing, and riding horses—and learning all the time to observe and judge distance by sound.

Since 1943 the placement section has found work in industry for over 700 blind men and women; and though some of these lost their work during the change over to peace conditions, over 600 kept their jobs, and a further 178 have been found work in the past year. A subcommittee on professional placement looks after the interests of blind professional people; and a permanent subcommittee does its best to help blind men with a strong sense of vocation to join the clergy and to carry out their duties effectively. Much of the work of the institute itself is done by blind people, and this is greatly encouraging to those newly blind who come to discuss their problems. "When a newly blind person finds that his phone call for an appointment is answered by a blind operator, that he is interviewed by a blind adviser with a blind stenographer at his elbow, that a blind guide conducts him round the building and shows him blind secretaries, blind transcribers, blind proof-readers, blind writers, blind typists, blind lecturers, blind musicians, blind physiotherapists, blind students at work, and that, to crown it all, a blind man, without a guide, puts him on the right bus for home, then he must feel encouraged. . . ."

The publication of Braille and Moon books, newspapers, and other periodicals is up to the pre-war level, but any increase in scope must depend on better supplies of paper. New premises have been found for the sound-recording studio for talking books, and new talking-book machines are being steadily acquired and supplied to users; but like all other equipment and appliances needed by the blind, they are still scarce.

GROWTH OF PART-TIME NURSING

ON Sept. 30 there were 17,257 part-time members of the nursing and midwifery staffs in our hospitals and other services. According to a report recently presented to the National Advisory Council on Nursing and Midwifery, this shows an increase of about 12,200 on the numbers of part-timers employed nine months before. The growing numbers have meant that waiting-lists for hospital beds, especially for chronic patients, have been greatly reduced, and in some areas have even disappeared. Many regions are now following the successful lead of Gloucestershire and Wiltshire, and the council consider that part-time schemes could be even more widely and thoroughly developed.

FAILURE AS A FAMILY

THE British Social Hygiene Council [1] is now publishing "occasional papers," of which the second is "Problem Families," [2] by Dr. C. Fraser Brockington. The common denominator of these families is that they are "unable by their own efforts to raise themselves from the state into which they have fallen." Dr. Brockington feels that existing social measures do not meet their needs, for the laws protecting children require that they should be removed from the family and placed in different surroundings, whereas the real need is for family regeneration. Moreover, in such problem families there are often strong ties of affection, and parents and children alike suffer when they are separated. He wishes to see a system of "family probation" introduced, problem families being registered as such and placed under the care of local authorities for rehabilitation. Arguments against registration will come readily to mind,[3] but all will agree with Dr. Brockington that it is more liberal to keep the family together (perhaps even at the cost of registration) and to attempt their regeneration as a group, than to compel them to separate. A possibility which he mentions—that of providing hostels where refractory or incompetent mothers can be given training—is already being tried by the Society of Friends.[4]

Dr. W. F. Roper, in "When the Family Fails," [5] discusses the process of socialisation, which, he says, calls for "the gradual interposing between the child and the gratification of his desires of the requirement that he shall secure what he wants by socially desirable means." This is what the family normally achieves, but when it fails the child may grow into the unsocial, the neurotic, or the criminal adult; and what is worse, will repeat his own faulty training in bringing up his family. Dr. Roper hazards a guess at the size of the problem: each year some 80,000 people in Great Britain

1. Annual report of the Tavistock Clinic and the Tavistock Institute of Human Relations, 1946. Obtainable from the secretary, 2, Beaumont Street, London, W.1.

1. Address: Tavistock House North, Tavistock Square, London, W.C.1.
2. Pp. 11. 6*d*.
3. See *Lancet*, 1946, i, 928.
4. *Ibid*, 1947, i, 266.
5. Pp. 10. 6*d*.

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commit indictable offences, and a quarter of these are reconvicted within five years; there is evidence that some 5% of the adult population—and this is very likely an underestimate—are adversely affected by neurotic symptoms; and he puts the proportion of the "ill-conditioned"—aggressive, acquisitive, selfish, and censorious people who work against the best interests of society—at about 10%. Thus, at least a quarter of the population would have benefited by being better brought up. He sees four main lines of prevention: improved economic status of families will remove one incentive towards selfish and acquisitive impulses; treatment of the ill-conditioned in prison, clinic, school, and institution may help to make better parents of them, and so benefit the new generation; family can help family in associations like the Peckham Health Centre; and propaganda will wake interest and spread knowledge. Finally, research alone can teach us more about the results of family failure and the remedies for it.

HONG-KONG'S HEALTH

NINE months ago we reviewed [1] the official report of Hong-Kong's war-time privations. The latest report [2]—that for 1946—is the last to be made by Dr. P. S. Selwyn-Clarke as director of Hong-Kong's medical services, before his appointment as governor and commander-in-chief, Seychelles. The statistics for last year give little hint of the hard years that went before. The infant-mortality rate was a third of that in 1940 and a sixth of that in 1931; while the death-rate (56·9 per 1000 in 1940) fell to 14·2. The report observes that two theories have been advanced in explanation of this fall: one is that the weaker went to the wall under the rigorous siege conditions; and the other is that the partial replacement of rice by flour has made for a better-balanced diet, with a lowered incidence of beriberi and other nutritional diseases.

University of Oxford

On Dec. 13 the degree of D.SC. was conferred on Mr. J. Walker, PH.D., a member of the scientific staff of the Medical Research Council in the chemotherapy department of the National Institute.

University of Manchester

At recent examinations the following were successful:

Final M.B. and Ch.B. Examination.—Mary K. Astin, Anthony Coady, M. B. Edwards, D. D. Hilton, R. A. Kershaw, Alwyn Kinsey, C. I. Moss, Raymond Ormerod, J. E. Parry, F. A. Rainford, O. R. W. Sejrup, Bernard Stone, Margaret E. Thorp, R. J. A. Webb, H. W. Wilson, Peter Wolf, D. H. Wright.

D.P.M. (part II).—George Christie, Frank Howarth, Helen E. Smith.

Royal College of Physicians of London

On Tuesday and Thursday, Feb. 10 and 12, at 5 P.M., Prof. G. S. Wilson will deliver the Milroy lectures at the college, Pall Mall East, S.W.1. He is to speak on the Public Health Laboratory Service.

Royal College of Surgeons of England

Sir Hugh Cairns, Nuffield professor of surgery in the University of Oxford, has left for a three months' visit to Australia and New Zealand as the first Arthur Sims travelling professor of the college. He will deliver lectures, make contact with medical scientists, and take part in research and postgraduate teaching. Later he is also to visit the principal medical centres of South Africa.

Colonial Office

Dr. R. S. F. Hennessey has been appointed an assistant medical adviser at the Colonial Office.

Dr. Hennessey, who is 42, graduated M.B. at Dublin in 1927, and later studied at the London School of Hygiene and Tropical Medicine, taking the DIPL. BACT. in 1932 and the D.T.M. & H. in 1939. In 1932 he also obtained his M.D. and in 1935 he became M.R.C.P.I. He was appointed to the Colonial Medical Service in 1929, and joined the Uganda laboratory service as a pathologist in that year. In 1944 he was transferred to Palestine as deputy director in charge of the Government medical laboratories, and later became deputy director of the Palestine department of health. While in Uganda, Dr. Hennessey was lecturer in pathology at Makerere College medical school. His published work on tropical pathology includes papers on keratomalacia in liver disease and on leucocyte output and vitamin intake. He was an associate editor of the *East African Medical Journal.*

1. *Lancet*, 1947, i, 566.
2. Hong-Kong Government: Annual Report of the Medical Department for 1946.

Faculty of Radiologists

Of the nine candidates who sat the recent examination for the fellowship of the faculty, the following were successful: J. E. Blewett, W. J. Latham, S. A. Maddocks (radiodiagnosis); and Esmond Millington (radiotherapy).

Society of Apothecaries of London

A court dinner was held in the hall of the society on Dec. 16 to celebrate the 330th anniversary of the first meeting of the court of assistants on Dec. 16, 1617. Prof. E. C. Dodds, F.R.S., the master, described the London of those days—the London Shakespeare knew. At a time when trade was more intimate and personal than it ever is today, the apothecary was principally a tradesman; he previously belonged to the Grocers' Company, and before that to the Pepperers. But his trade needed much knowledge and skill, and he had already begun to visit patients instead of merely dispensing medicines prescribed by physicians. The society had since attained and maintained a unique place in the life of the community, being at once a City company and a professional body granting licences to practise. It had played its part throughout the centuries through buffetings like those experienced by London itself, and it still looked to the future rather than the past. Sir Frederick Wells, the lord mayor, who was accompanied by the sheriffs, said that today it is more than ever necessary to maintain the great traditions for which the City companies stand. Dr. C. Thackray Parsons, past master, remarked that "330 years is hardly a day in the life of this great city founded by Magog, grandson of Noah." With suitably classical allusions he welcomed The Guests, among them the Bishop of London, Sir Henry Dale, O.M., and Captain A. Faunce-Delaune, descendant of the society's founder, Gideon Delaune, who died at 95 (or 97) after producing 37 children by one wife. Captain Faunce-Delaune, who still lives at Shelstead Manor, bought by one of Gideon's sons, admitted to "some nebulous connexion with the gentleman in marble." Sir Henry Dale, also responding, was even more guarded about his association with the portrait of Samuel Dale, the first writer to apply the term pharmacology to the materia medica. Pointing to the contrast between Samuel Dale's time and our own, he said that, so far as medicine is concerned, the present epoch is characterised by a fertilising reunion between organic chemistry and biological science, and in no direction have more revolutionary advances been made than in medical treatment. Well into living memory—long after the apothecaries became licensed practitioners, the rank and file of a great profession—therapeutics changed little in aim and principle. Whoever expected that doctors' medicine would do anything in particular? The best hoped for was that it would make the patient comfortable and leave nature to get on with the contest. Today, on the other hand, we have a range of remedies which really deal with the cause of disease. Is it realised, for example, what a chance we have of altogether getting rid of diphtheria in this country if Sir Wilson Jameson receives the support his campaign deserves? Progress is proceeding and accelerating: each month, almost, holds out the prospect of subduing another of our old enemies. The hopes to which the society's founders were clumsily groping their way show signs of being realised by science—if only science can be saved from perverting itself to the destruction of mankind.

Corrigendum.—The article by Major Collard and Lieut.-Colonel Hargreaves on Neuropathy after Stilbamidine Treatment of Kala-azar (Dec. 6, p. 686) contained the statement that pentamidine is known to cause polyneuritis. This is true of a related substance but not of pentamidine itself.

Appointments

BASTER, NORMAN, M.B. Leeds, D.P.H.: asst. county M.O.H., Worcs, and M.O.H., Redditch and Bromsgrove.

CLELAND, W. P., M.B. Adelaide, F.R.C.S., M.R.C.P.: asst. surgeon, Hospital for Consumption and Diseases of the Chest, Brompton.

FALLA, W. A. S., M.D. Durh., D.P.M.: medical superintendent, Bracebridge Heath Mental Hospital, Lincoln.

HODSON, C. J. C. G., M.B. Lond., M.R.C.P., D.M.R.E.: radiologist, University College Hospital, London.

LEWIS, R. I., B.SC. Wales, M.D. Lond., D.M.R.E.: radiologist, Royal Halifax Infirmary.

MILLER, A. A., M.A., M.D. Edin., D.T.M., D.P.H.: director of department of pathology, Preston and County of Lancaster Royal Infirmary.

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